

7.4 MODELING RESULTS

7.4.1 Baseline Results

Predicted ozone and NO₂ as a function of time along the five trajectories are shown in Figures 7-6 through 7-10. These figures show the baseline results for the center column using the initial concentrations and emissions described above. Table 7-8 compares the predicted ozone concentrations to the observed values along the trajectories. The average difference between predicted and observed concentrations in Table 7-8 is 10%.

The predicted ozone concentrations along the westerly flow and easterly flow portions of trajectory #1 show gradual increases from 60 to 90 ppb and 150 to 170 ppb, respectively, between 0600 and 1200 PST. After the air from the two trajectories mixes and moves onshore at 1500 PST, the predicted ozone is 127 ppb. This result is 10% below the observed value of 140 ppb at the El Rio monitor. The predicted values for the easterly flow trajectory are within the range of O₃ observed by the aircraft offshore: 100 to 170 ppb at 1030 PST and 130 to 250 ppb at 1530 PST; however, this range is very wide. The complexity of the flow field on this day precludes placing much confidence in the trajectory model results. If the split trajectory approach employed is a reasonable approximation to the actual flow, then the small underprediction at El Rio is believed to be a result of underprediction in ozone formation along the easterly trajectory (i.e., where significantly higher O₃ levels were observed by the aircraft than were predicted by the model).

Predicted ozone concentrations along trajectory #2 gradually increase from 50 ppb at 0600 PST to 140 ppb at 1200 PST when the air parcel reaches the shoreline and the Ventura monitoring station. The model prediction is 10 ppb below the 150 ppb observed value at Ventura. A small amount of ozone scavenging (by NO_x) is predicted as the air parcel passes the coastal sources; however, these emissions generate additional ozone (approximately 20 ppb) several hours downwind when the parcel has moved into the mountain region northeast of Ojai. The off-centerline parcel column passes over the Ojai monitor at 1330 PST. The model predicts 133 ppb ozone for this column, which agrees well with the 130 ppb observation at the Ojai station. We have more confidence in the flow field for this trajectory than for trajectory #1 because of greater consistency in the wind and ozone data. For example, the Laguna Peak data indicate 130 ppb ozone in the onshore flow for hours 1100 and 1200 PST. The 1030 PST offshore data and the 1200 PST La Conchita data indicate approximately 100 ppb ozone. Thus, the onshore flow of elevated ozone concentrations is fairly wide spread on this day. The good model results on this trajectory are primarily a result of initializing the model with the correct amounts of ozone and, to a lesser extent, RHC and NO_x. Some ozone is formed along the trajectory; however, the majority is included in the 0600 PST initial values.

The results for trajectory #3 show rapidly increasing ozone concentrations as the air moves over the San Fernando Valley and into Ventura County. The model predictions lag behind the ozone observations; however, the model does predict fairly high ozone levels. The model predictions are 142 ppb ozone at Reseda (1230 PST), where 190 ppb was observed and 190 ppb at Simi Valley at 1330 PST, where 230 ppb was observed. We are fairly confident in the trajectory up to Simi Valley. After passing Simi Valley, the

TRAJECTORY #1

Predicted NO₂ and O₃

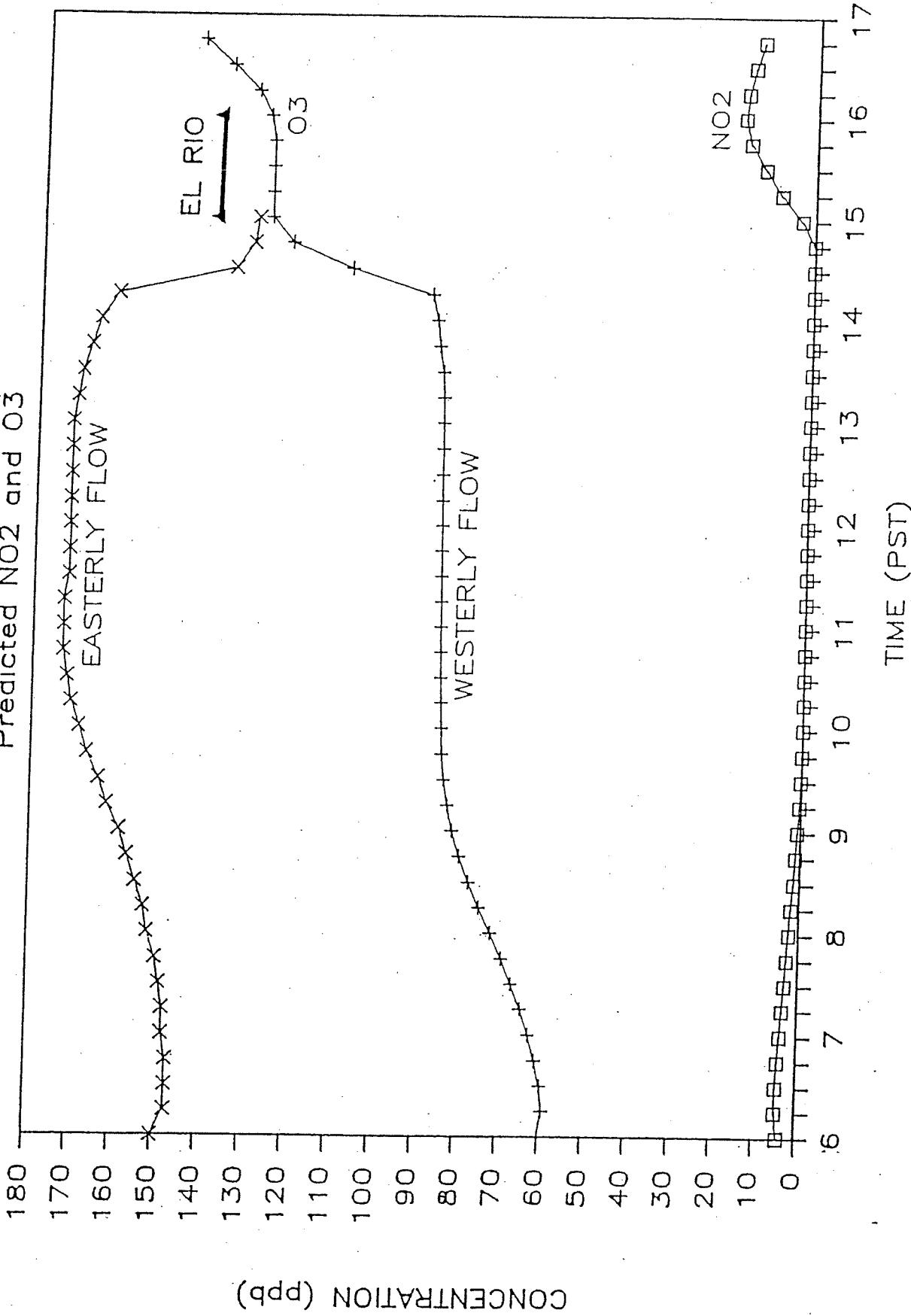


Figure 7-6. PLMSTAR Model Predictions for September 11, 1983, Trajectory #1

TRAJECTORY #2

Predicted NO₂ and O₃

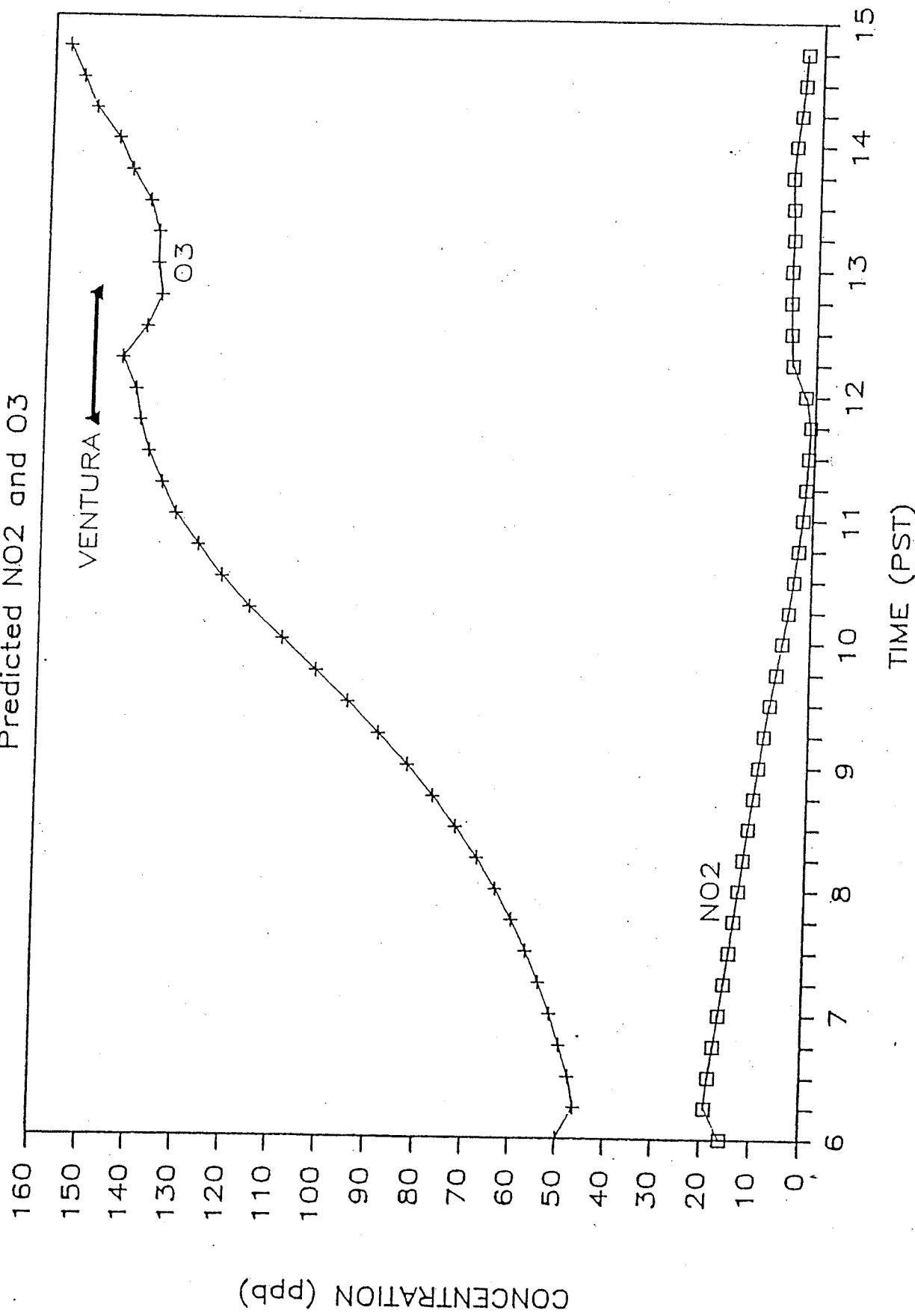


Figure 7-7. PLMSTAR Model Predictions for September 12, 1983, Trajectory #2

TRAJECTORY #3

Predicted NO₂ and O₃

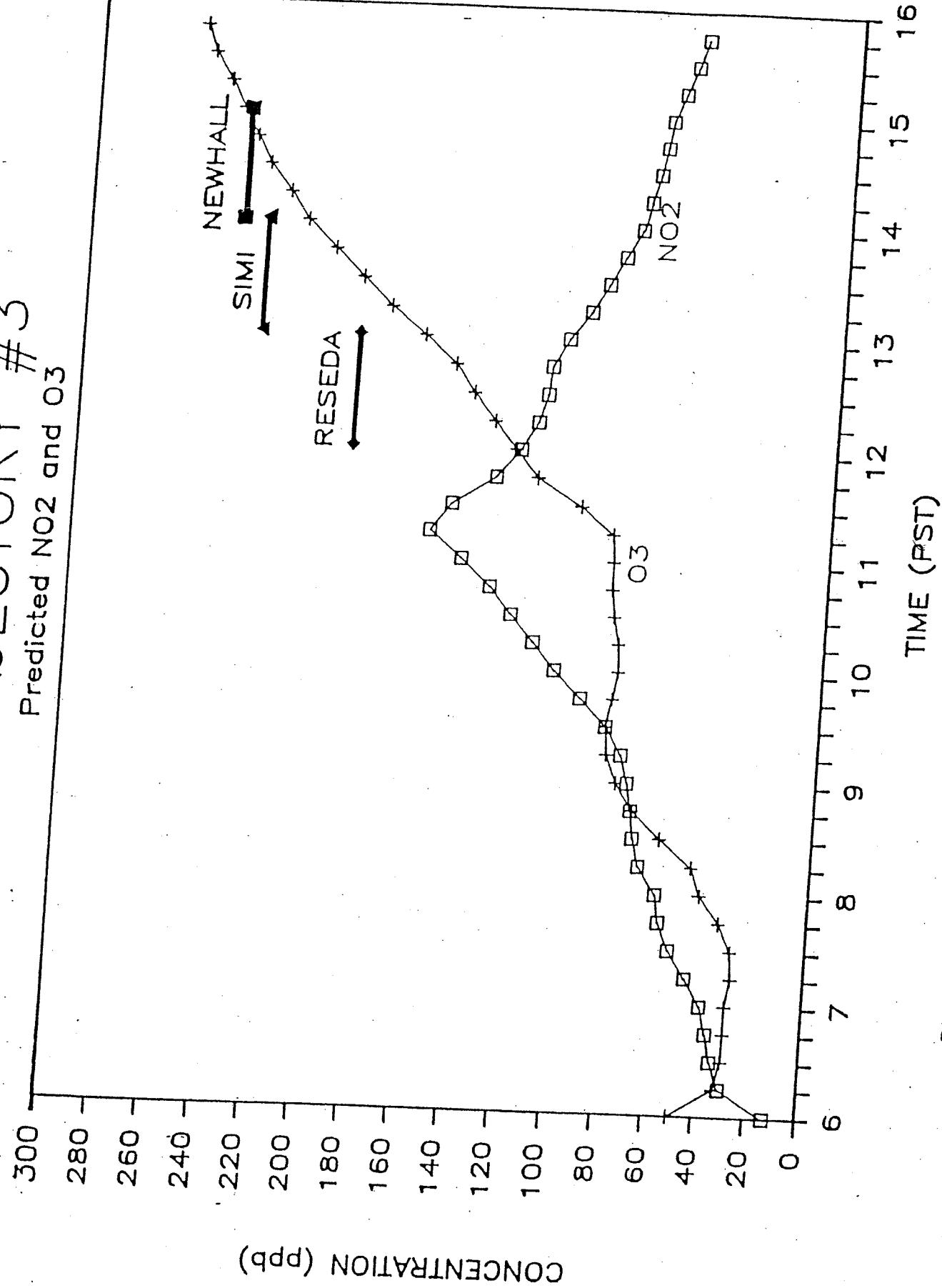


Figure 7-8. PLMSTAR Model Predictions for September 12, 1983, Trajectory #3

TRAJECTORY #4

Predicted NO₂ and O₃

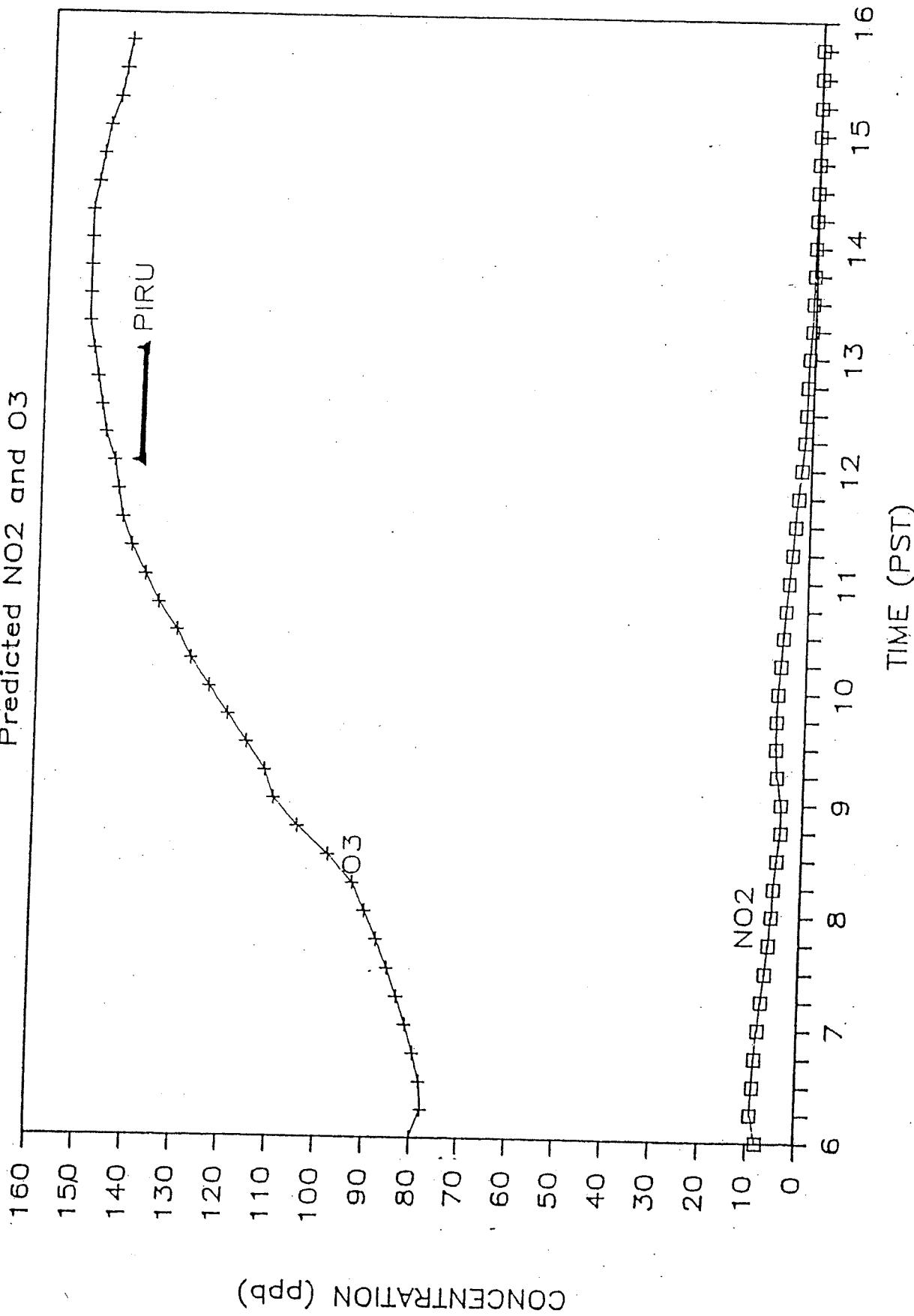


Figure 7-9. PLMSTAR Model Predictions for September 14, 1983, Trajectory #4

TRAJECTORY #5

Predicted NO₂ and O₃

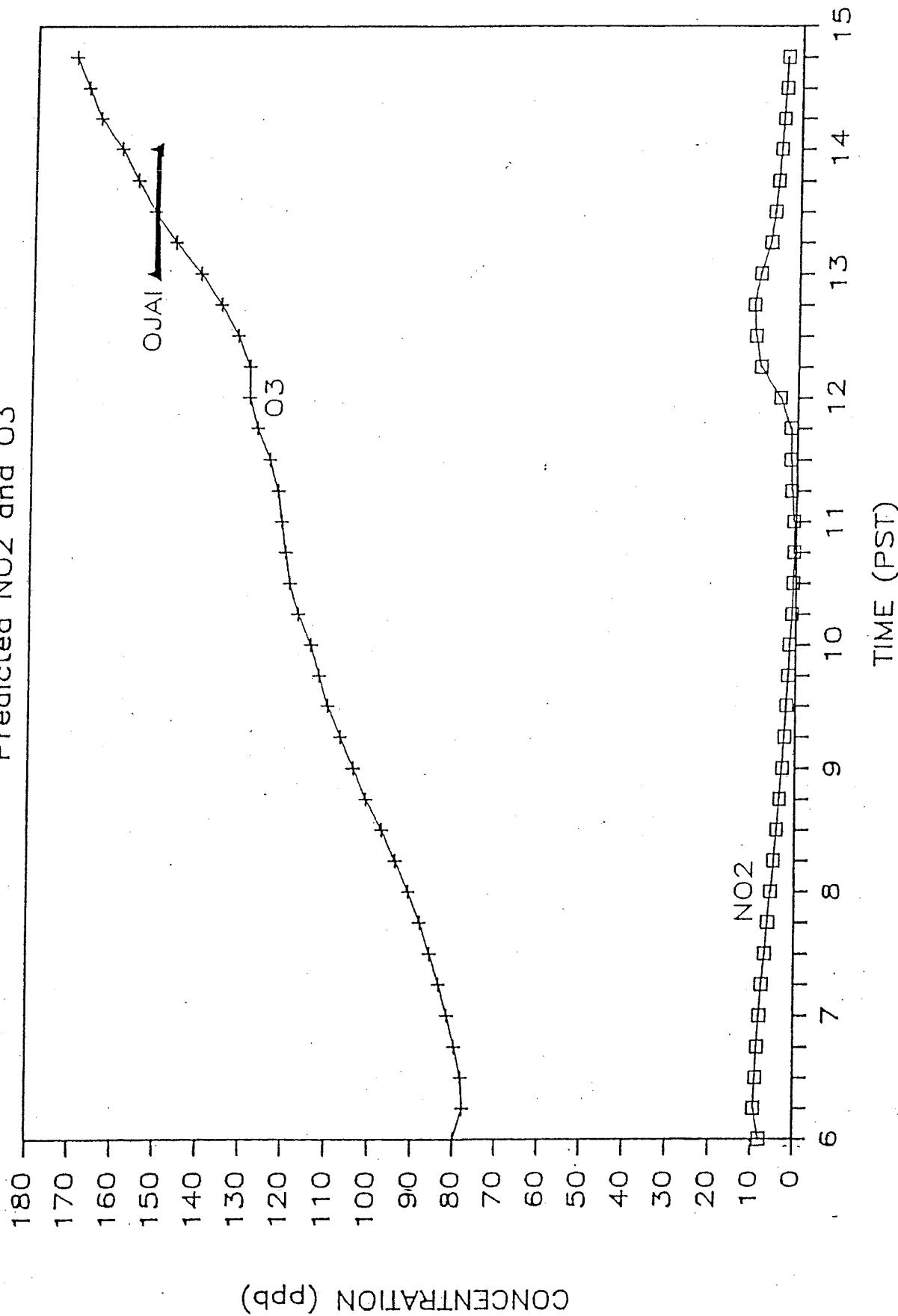


Figure 7-10. PLMSTAR Model Predictions for September 14, 1983, Trajectory #5

Table 7-8. Predicted and Observed Ozone Concentrations (ppb)

Trajectory	Station	Date	Time (PST)	Predicted	Observed	<u>Observation</u> <u>Predicted</u>
#1	El Rio	9/11/83	1530	127	140	1.10
#2	Ventura	9/12/83	1230	139	150	1.08
	Ojai		1330	133	130	.98
#3	Reseda	9/12/83	1230	143	190	1.33
	Simi Valley		1330	190	230	1.21
	Newhall		1430	237	240	1.01
#4	Piru	9/14/83	1230	148	140	.95
#5	Ojai	9/14/83	1330	152	150	.99

trajectory is uncertain because the southeasterly flow converges with westerly sea breeze. The model prediction for the column passing Newhall at 1430 PST is 237 ppb ozone, which is close to the 240 ppb observation; however, this agreement may be fortuitous. The high ozone concentrations along this trajectory are a result of Los Angeles County RHC and NO_x emissions and high ozone levels aloft which are entrained into the mixed layer. The underprediction of ozone at Reseda and Simi Valley may be due to underestimation of the ozone levels aloft. An initial value of 150 ppb was employed in the absence of measurements; however, higher values may be justifiable since ozone in the eastern SCAB reached 370 ppb on the previous day.

Trajectory #4 is another example of ozone, formed from Los Angeles County emissions, moving up the coast and onshore the next day in Ventura County. Ozone predictions along the trajectory exceed the observations somewhat. The model predicts 130 ppb ozone at 1030 PST, when the El Rio and Ventura monitors observed 90 and 110 ppb. The model predicts 148 ppb at Piru at 1230 PST, where 140 ppb was observed. Aircraft ozone data show coastal ozone concentrations aloft of 150 to 200 ppb at 1030 PST, when the model predicts 136 ppb aloft. The overprediction of coastal station observations may be a result of overestimating the mixing height and the rate of entrainment of the ozone aloft near the coast. Coastal fog below 200 m prevented collection of temperature soundings by the aircraft, so the mixing heights employed for the simulations could easily be high. The discrepancy between observations and predictions is smaller at Piru where mixing extends to higher elevations. We are reasonably confident of the flow on this trajectory, since the available wind data and the offshore ozone aloft data during the morning hours are all consistent.

Trajectory #5 is very similar to #4, except the flow is channeled up to Ojai rather than Piru. Ozone predictions are also very similar. The model overpredicts the ozone when it passes Ventura at 1215 PST (127 vs. 80 ppb); however, it predicts 152 ppb at Ojai at 1330 PST where 150 ppb was observed. The discrepancy near the coast is again believed to be due to uncertainty in the mixing heights and the rate at which the high ozone concentrations aloft are mixed into the surface layer. As with trajectory #4, we are relatively confident in the flow pattern for this case.

In summary, the baseline results for trajectories bringing offshore ozone into Ventura County monitors are within 15 ppb, or 10% of the observed ozone maxima. We have little confidence in results for trajectory #1 because of complex offshore mixing, however, we are reasonably confident in the flow for trajectories 2, 4, and 5. Results for Trajectory #3 that bring ozone and ozone precursors over land from Los Angeles to Simi Valley show underprediction of the observed maxima by 40 ppb and 17%. The model's baseline results for these cases are reasonably good, considering the data and inherent model limitations.

7.4.2 Sensitivity to Initial Concentrations

The most uncertain parameters in the simulations of overwater ozone transport into Ventura County are the initial pollutant concentrations. One trajectory (#4 ending at Piru) was selected for performing sensitivity runs to illustrate the importance of the initial concentrations. Simulations were made with factor of 2 variations in the initial NO_x and RHC

concentrations, and $\pm 30\%$ variations in the initial ozone values. Table 7-9 summarizes the changes in predicted ozone concentrations at Piru for the various input changes. Figures 7-11 through 7-13 show the predicted ozone relative to the baseline predictions for these sensitivity runs.

The results for a 50% decrease in the initial NO_x show a 14 ppb or 10% decrease in the ozone concentration at the Piru station (1230 PST). A 100% increase in the initial NO_x is estimated to increase the ozone at Piru by 18 ppb or 12%. The model's ozone predictions are fairly insensitive to the large relative changes in initial NO_x in this case because the baseline NO_x is low (approximately 6 ppb column average), and the initial ozone is high (approximately 100 ppb column average). Ozone formation along the offshore portion of the trajectory is limited by the availability of NO_x rather than HC in all three runs.

The results for a 50% decrease in the initial RHC levels show lower ozone levels along most of the trajectory than those for the baseline case. At 1100 PST (Santa Paula) and 1230 PST (Piru), the ozone is predicted to be 18 ppb or 13% lower and 7 ppb or 5% lower, respectively, than in the baseline simulation. At the end of the run, however, the results with the baseline and lower initial RHC are identical. The results for the run with a 100% increase in the initial RHC show slightly higher ozone before 1100 PST and slightly lower ozone after 1100 PST than the baseline case. The ozone is 5% higher at 0900 PST, when the air comes onshore, and 8% lower at 1230 PST when the trajectory reaches Piru than the baseline case. These results illustrate the complexity of the NO_x -RHC interaction. They are perhaps best understood in terms of the familiar O_3 isopleth diagram, shown in figure 7-14. If the low RHC case corresponds to an HC/ NO_x ratio along the isopleth ridge (point A), and the baseline (B) and high RHC (C) cases are in the high HC/ NO_x regime, then the isopleth diagram would suggest the same sensitivity of maximum ozone to RHC. Chemically, this occurs because as the HC/ NO_x ratio becomes very high, the NO_x is used less efficiently in forming ozone. In an overall sense, these results show that the computed ozone along this trajectory is not very sensitive to large changes in the RHC offshore. The 50% decrease and 100% increase produce less than 8% difference in the maximum ozone. However, RHC concentrations affect the location and time of the maximum ozone.

The results of the runs with $\pm 30\%$ variation in the initial ozone concentrations show $\pm 15\%$ to 20% change in the downwind ozone concentrations. With 30% decreased initial ozone, the prediction at Piru is 27 ppb and 18% less than in the baseline case. With 30% increased initial ozone, the prediction at Piru is 23 ppb and 16% more than the baseline results. Thus, a 30% variation in the initial ozone has more effect than factor of 2 variations in the initial RHC and NO_x . This result is consistent with the fact that incremental ozone formation from precursors is less than the initial ozone levels in these 8- to 10-hour trajectory calculations where most of the time is spent offshore.

7.4.3 Assessment of the Ozone Transport and Local Emission Components

It is relatively straightforward to estimate the contributions of inflow ozone, ozone precursors, and local emissions to Ventura County ozone on some of the trajectories considered because the high ozone observations occurred at sites near the county line or coastline which were

Table 7-9 Results of sensitivity runs using the 9/14/83
Piru trajectory as a base.

Input parameter changed	% change in input	% change in predicted ozone at Piru
NOx	-50	-10
NOx	+100	+12
RHC	-50	- 5
RHC	+100	- 8
Ozone	-30	-18
Ozone	+30	+16

SENSITIVITY TO INITIAL NO_x

Trajectory #4

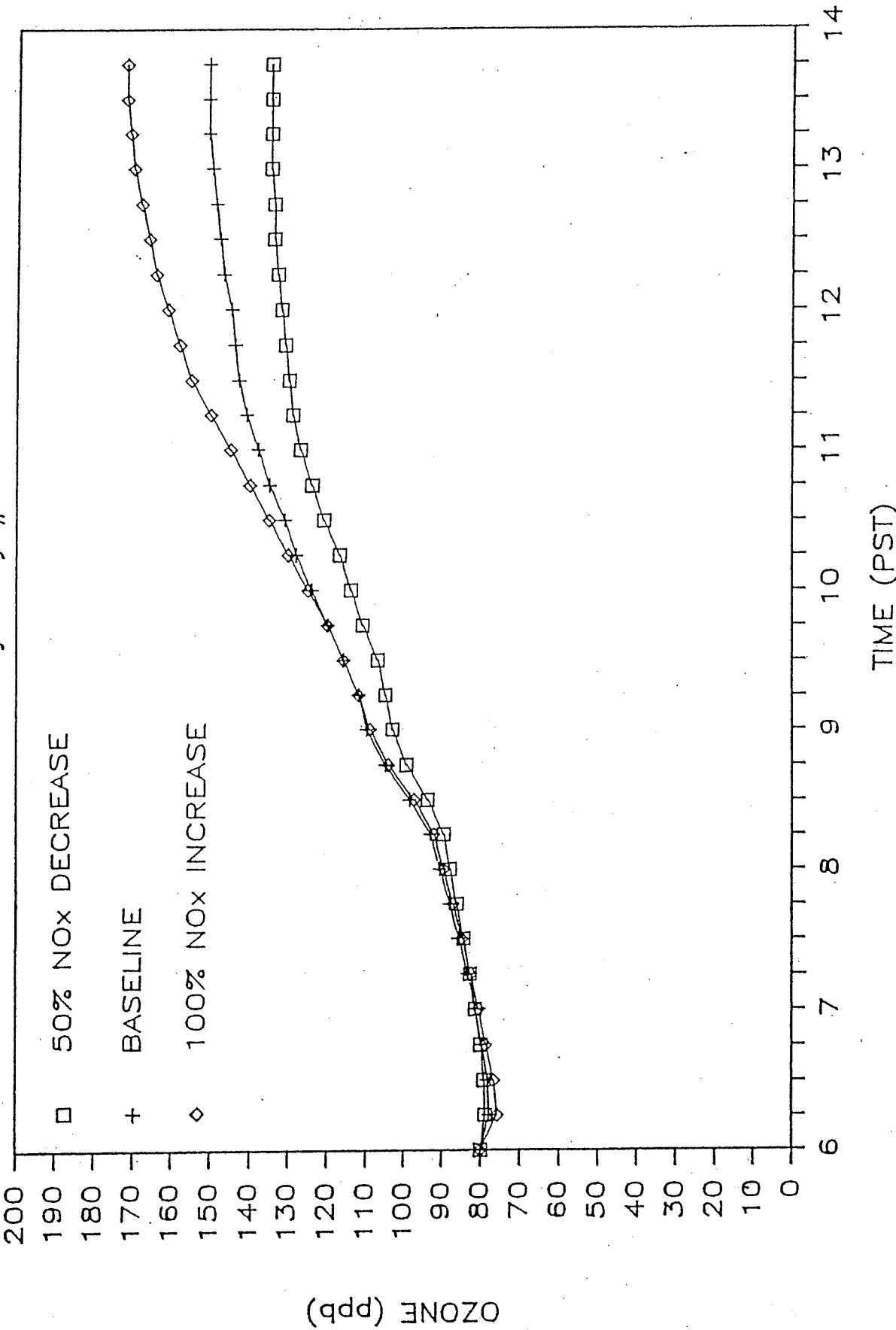


Figure 7-11. Sensitivity of Predicted Ozone to Variation in Initial NO_x Concentrations

SENSITIVITY TO INITIAL RHC

Trajectory #4

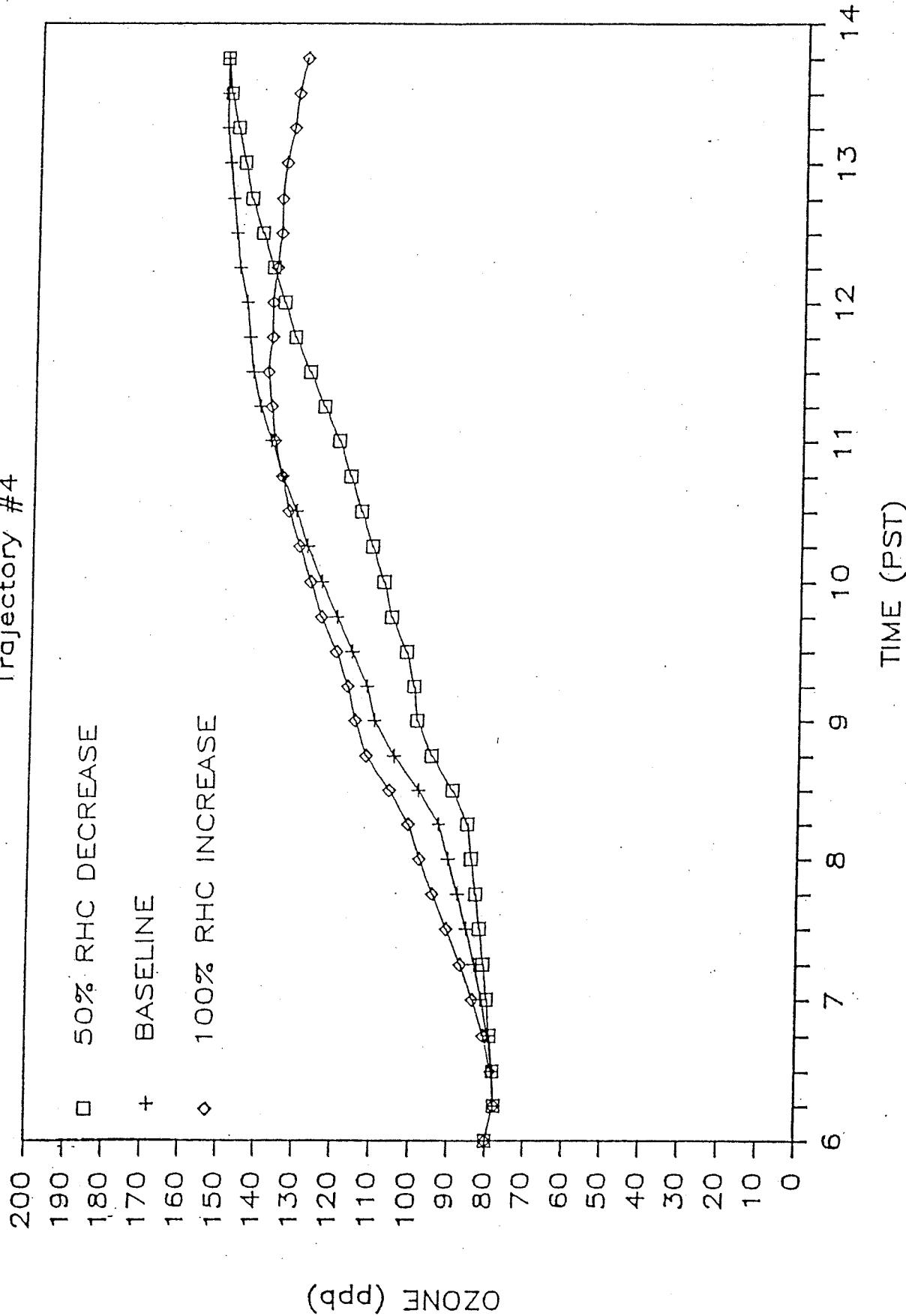


Figure 7-12. Sensitivity of Predicted Ozone to Variations in Initial RHC Concentrations

SENSITIVITY TO INITIAL O₃

Trajectory #4

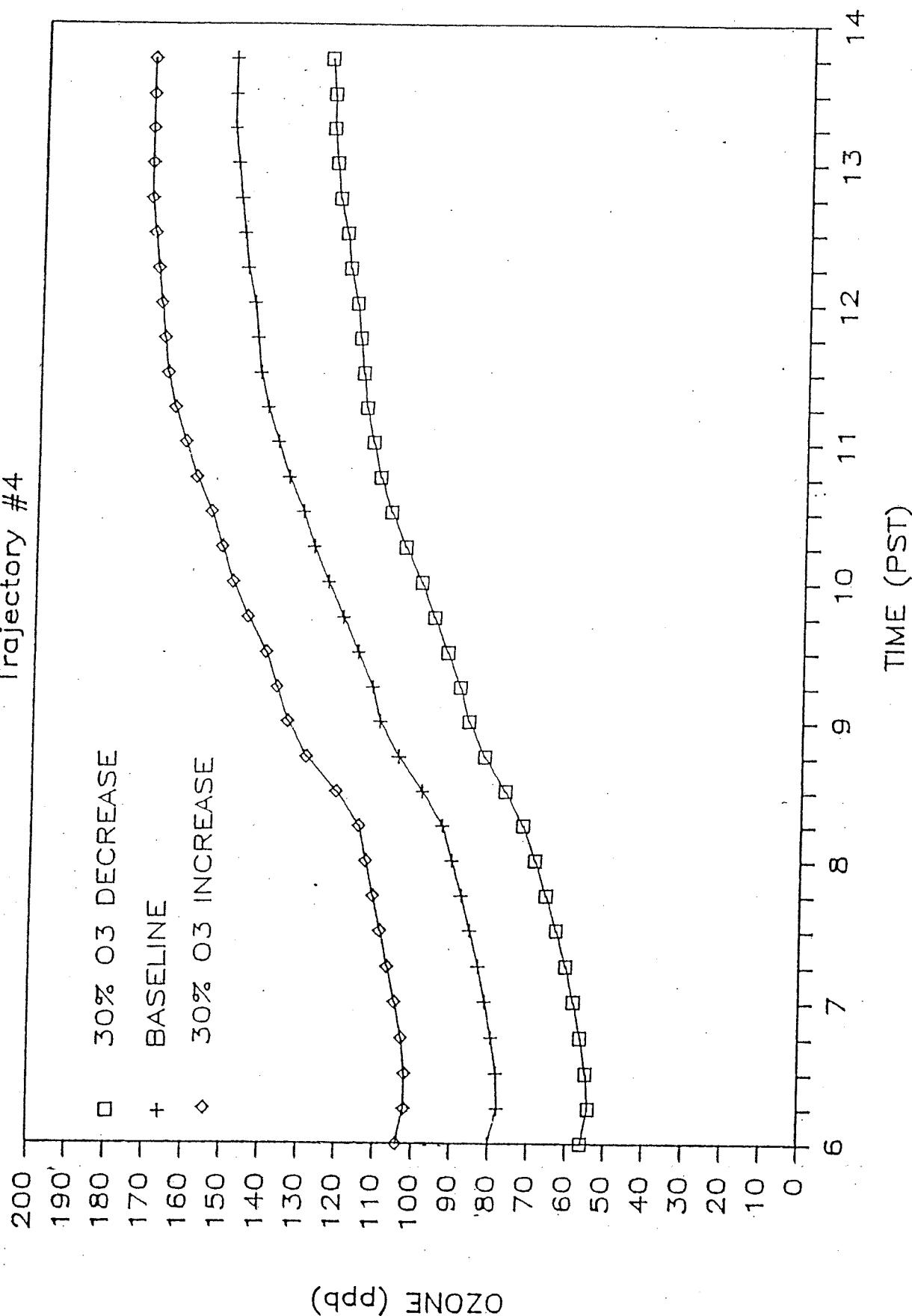


Figure 7-13. Sensitivity of Predicted Ozone to Variations in Initial Ozone Concentrations

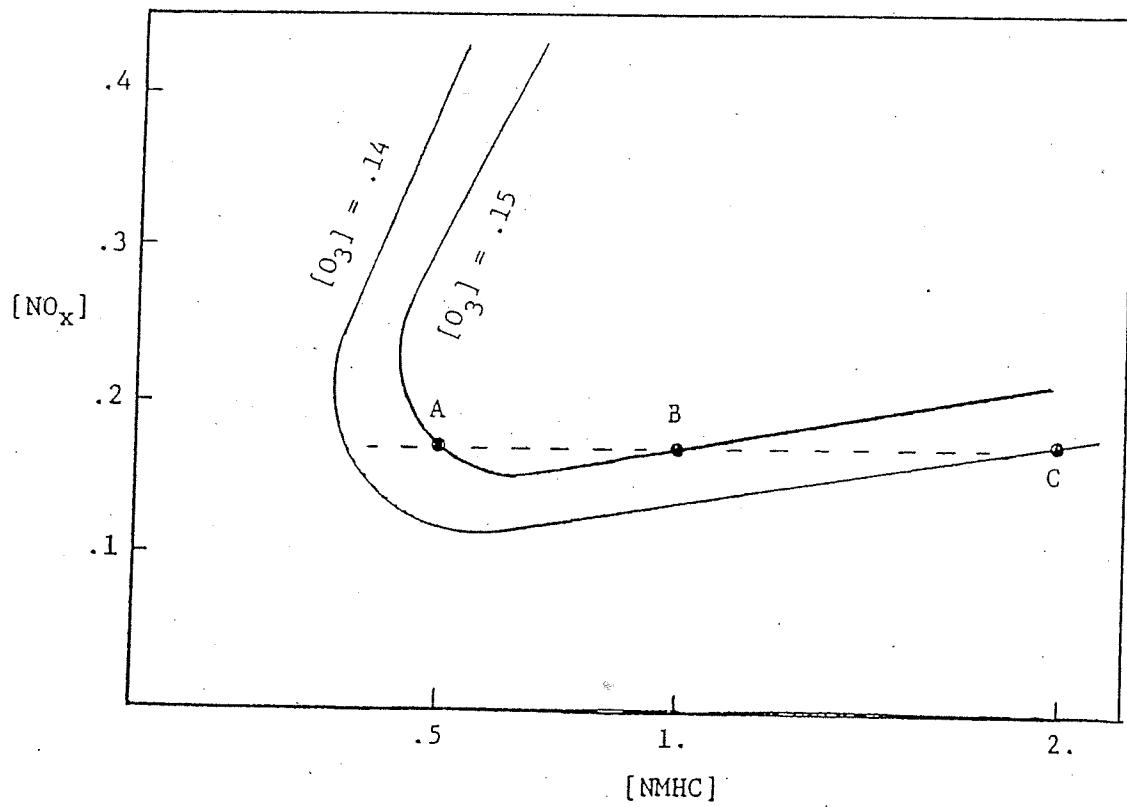


Figure 7-14. Generic Ozone Isopleth Diagram

essentially not influenced by Ventura County emissions. The trajectories arriving at El Rio on September 11 and at Ventura and Simi Valley on September 12 are examples of high ozone occurrences where the contribution of local emissions is essentially zero. The transport component for these cases is approximately the difference between the observed ozone maxima and typical summer background ozone levels, 40 to 60 ppb. That is, we assume all inflow air at the Ventura County boundaries would contain 50 ppb of ozone (natural summer background) if there were no emissions in the neighboring air basins. Also, since the stations are a few miles from the County boundaries, it is assumed that a small amount of ozone (5 ppb) could be formed between the boundary and the station. The ozone in excess of 55 ppb is the transport component due to emissions outside of Ventura County. Therefore, the transport components at El Rio on September 11th and Simi Valley on September 12th were 85 and 175 ppb, respectively.

The photochemical model was used to estimate the transport and local emission components of the high ozone observations for September 14 trajectories which entrain significant Ventura County emissions prior to arriving at the ozone monitors at Piru and Ojai. Simulations were made with 50 ppb O_3 , 1 ppb NO_x , and 150 ppb RHC initial concentrations at all levels of the air parcels to represent clean inflow conditions. The predicted ozone concentrations for these runs are shown in Figures 7-15 and 7-16. The difference between the baseline and clean results is the estimated transport component. At the Piru station on trajectory #4, the transport component is 67 ppb. At Ojai on trajectory #5, the transport component is 78 ppb. These transport components are approximately half of the observed maxima. It is clear from these results that it would be very unlikely for Ventura County emissions to generate sufficient ozone to exceed the 120 ppb federal standard under these meteorological conditions if it were not for the elevated ozone concentrations offshore.

The local emission components for these two trajectories have been estimated by simulating the trajectory with the baseline initial concentrations and without the Ventura County emissions. Without emissions, the predicted ozone is 125 ppb at Piru on trajectory #4 and 123 ppb at Ojai on trajectory #5. Hence, the emissions are predicted to contribute 23 ppb or 16% to the ozone maximum at Piru and 29 ppb or 19% to the ozone maximum at Ojai on this day. These estimates are quite uncertain because the initial or transported concentrations are poorly known. The local components could be substantially higher if the actual HC concentrations offshore were lower. The important point to recognize here is the ozone forming potential of local emissions depends strongly on the HC/NO_x ratio and, to a lesser extent, the O_3 concentration of inflowing air.

Table 7-10 summarizes the estimates for the local and transport components of the observed ozone on the trajectories. The estimates show that the summer background ozone accounts for 22 to 35% of the observed maxima. The local components account for 0 to 19% of the ozone maxima. The transport component accounts for 47 to 76% of the ozone maxima. Thus, for these days with south-southeast flow in the morning hours, the transport component is the largest contributor to the observed ozone. This result is consistent with the fact that the SCAB RHC and NO_x emissions are more than an order of magnitude greater than Ventura County emissions; that maximum ozone from RHC and NO_x emissions is generally expected to occur 30-60 km downwind of the source location and that ozone loss processes are

TRAJECTORY #4

Baseline vs. Clean Initial Conditions

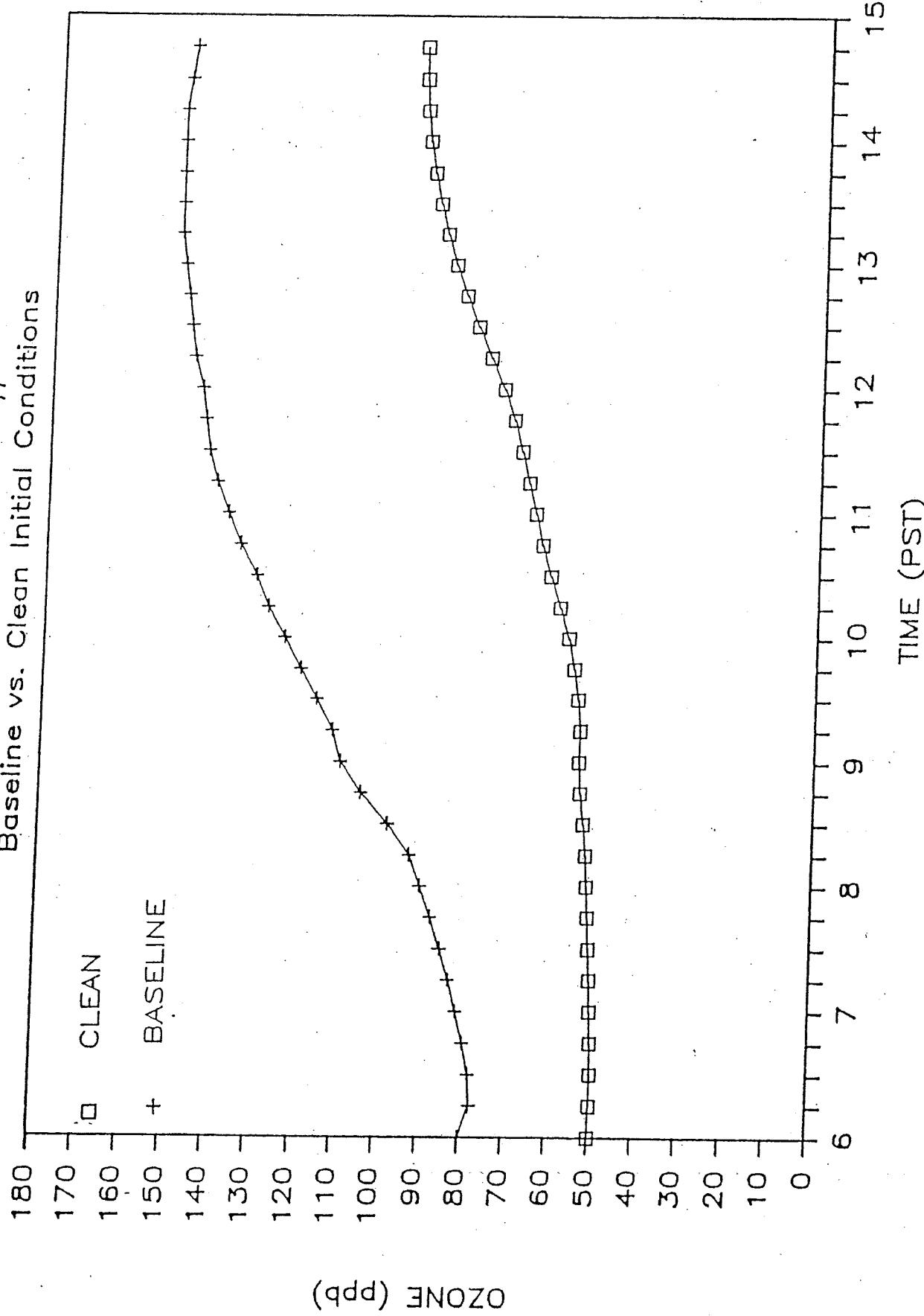


Figure 7-15. Predicted Ozone Concentrations on Trajectory #4 with Clean and Baseline Initial Concentrations

TRAJECTORY #5

Baseline vs. Clean Initial Conditions

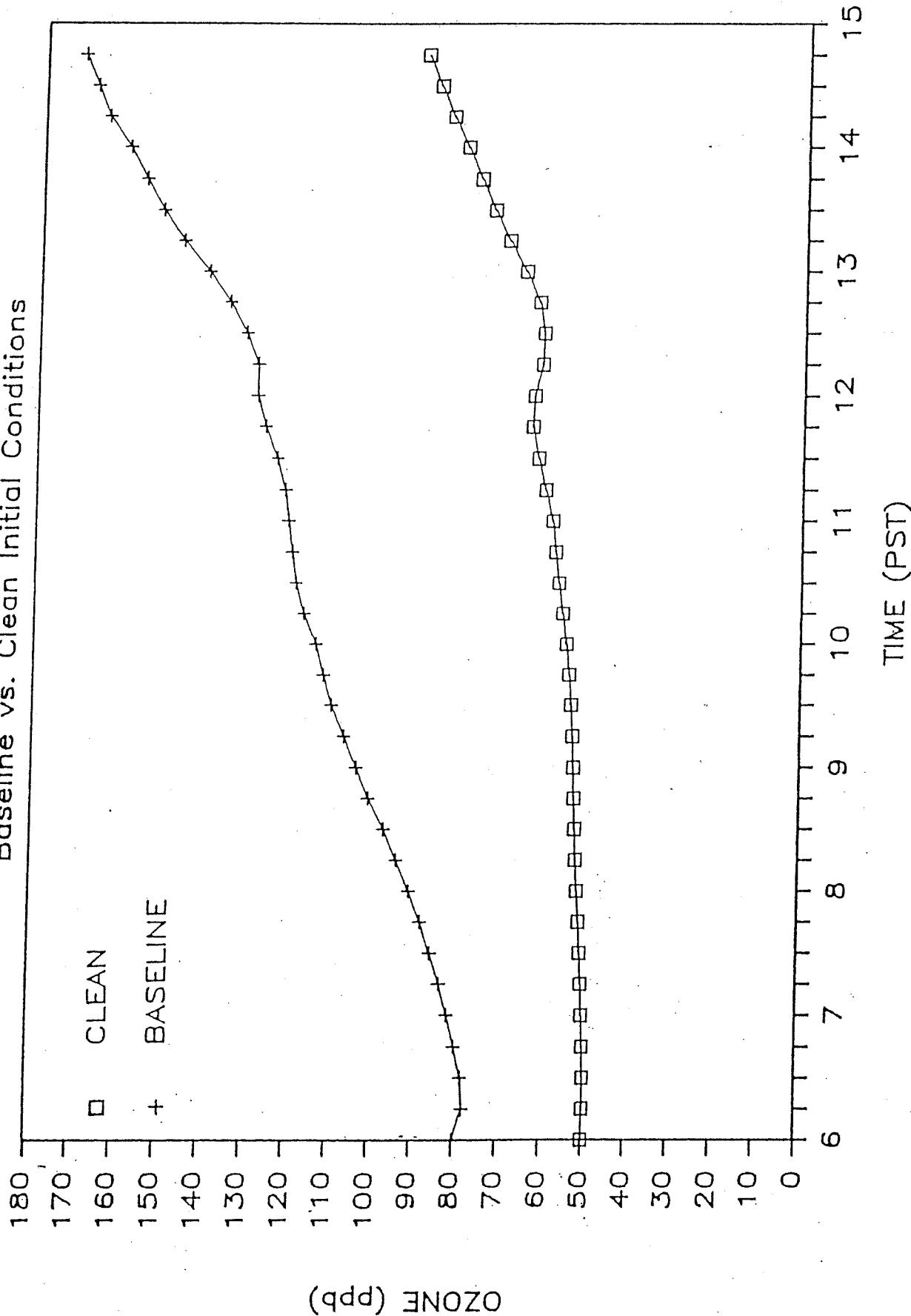


Figure 7-16. Predicted Ozone Concentrations on Trajectory #5 with Clean and Baseline Initial Concentrations

Table 7-10. Estimated Components of the Observed Ozone (ppb)

Trajectory	Station	Background	Transport Component	Local Component	Total Ozone
1	El Rio	50	> 85	< 5	140
2	Ventura	50	> 95	< 5	150
3	Simi Valley	50	> 175	< 5	230
4	Piru	50	67	23	140
5	Ojai	50	71	29	150

very slow over water and in elevated layers which are decoupled from the surface.

The transport components indicated above are substantially higher than the average transport components of 10-20 ppb ozone indicated by the statistical analysis in Section 5. However, the definition of the transport component is quite different in the two analyses. The definition in the statistical analysis is the difference in Ventura County ozone maxima on days with and without 1000 PST 3000' winds suggesting transport from Los Angeles to Ventura County. Hence, it basically contrasts the ozone on days with different meteorological flow patterns. For the modeling analysis, the transport component is defined as the contribution of the non-Ventura County emissions component on high ozone days when there was persistent meteorological transport from Los Angeles County. Thus, the two results are not directly comparable. Nevertheless, the large difference between the two results deserve comment. Besides the difference in the definition, the large difference is due to the fact that the modeling analyses were performed for five documented cases of ozone transport that were chosen for their high transport contributions. These five cases are at the extreme end of the distribution of days that would be classified as "transport" days in the statistical analysis. Had the modeling days been selected randomly from the "transport" days identified in the statistical analysis, the modeled transport component most likely would have been much smaller.

7.4.4 Summary of Modeling Results

In summary, the photochemical model was run for five trajectories on three days with strong evidence of ozone transport from Los Angeles to Ventura Counties. Even though the trajectory model uses a very simple representation of the complex flow fields and many of the model inputs are uncertain, the model predictions for ozone at key receptor stations agree fairly well, +/- 20% or better with the observed concentrations. Some diagnostic adjustment of uncertain model inputs was performed to improve agreement between the predictions and observations. Sensitivity analysis was performed to quantify the importance of the initial HC, NO_x and O₃ concentrations that were adjusted. Simulations were also carried out to assess the contributions of local emissions and transported ozone and its precursors.

In general, the photochemical modeling results are entirely consistent with the analysis of the case studies presented in Section 3. The results suggest that a large fraction of the ozone concentrations observed in Ventura County on days with southeasterly winds aloft may be due to transport of ozone and its precursors into the County from Los Angeles County. The transport component may be especially large when Santa Ana winds occur after episodic ozone levels are formed in the South Coast Air Basin. The model and input data used for the analysis are too uncertain to precisely quantify the contributions of transported ozone and its precursors; however, the results qualitatively confirm that the contribution may be large under certain meteorological conditions. The results also indicate that reduction of HC and NO_x emissions in Ventura County may have little or no effect on maximum ozone concentrations in the County under certain meteorological conditions. Thus, it should be recognized that Ventura County can be a downwind receptor for ozone generated from SCAB emissions much like Riverside and San Bernardino Counties.

8. REFERENCES

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APPENDIX A

SELECTED DATA FROM THE VCOT STUDY

SEPTMEBER 1 - OCTOBER 6, 1983

Table A-1

DAILY MAXIMUM OZONE LEVELS DURING VCOT STUDY
(PPHM)

<---VALLEY SITES---

--> ELEVATED SITES-->

DATE	EL RIO	OJAI	PIRU	SIMI	THOUSAND OAKS	VENTURA	LAGUNA PEAK	ROCKET-DYNE	REGIONAL MAX
9/2	5	8	8	9	8	9		9	9
9/3	5	11	12	13	11	6		15	15
9/4	7	9	11	11	12	4		14	14
9/5	9	10	11	12	11			16	16
9/6	7	12	13	15	13	9		17	17
9/7	5	10	10	14	9	6	7	15	15
9/8	5	7	7	10	9	5	5	10	10
9/9	6	7	7	6	8	6	6	7	8
9/10	12	11	11	11	15	8	11	14	15
9/11	14	8	11	10	12	10	11	11	14
9/12	7	14	17	23	18	15	13	28	28
9/13	13	12	15	16	13	13	14	18	18
9/14	10	15	14	15	12	12	14	19	19
9/15	8	12	13	15	10	10	11	17	17
9/16	7	9	12	15	9	9	17	14	17
9/17	8	13	14	17	12	5	15	18	18
9/18	7	10	12	15	10	4	15	14	15
9/19	10	12	11	12	10	14	15	13	15
9/20	5	6	6	10	6	6	7	9	10
9/21	2	5	5	7	3	5	2	5	7
9/22	3	5	4	7	4	5		7	7
9/23	6	6	6	8	6	6		7	8
9/24	7	8	9	11	9		7	11	11
9/25	7	8	8	10	8		7	10	10
9/26	5	5	5	7	5	5	5	5	7
9/27	6	6	7	9	8	7	8	8	9
9/28	4	5	5	6	5	8	6	5	8
9/29	5	4	4	6	4	6		3	6
9/30	3	3	3	3	4	5		3	5
10/1	4	4	3	6	5	5		4	6
10/2	4	4	4	7	5	5		6	7
10/3	6	7	7	9	9	7		9	9
10/4	6	8	6	15	11	7	6	14	15
10/5	5	6	5	8	6	7	5	7	8
10/6	5	7	5	9	10	7	8	11	11

TABLE A-2 DAILY MAXIMUM OZONE LEVELS AT UPWIND SOUTH COAST SITES
(pphm)

DATE	LENNOX	WEST LA	RESEDA	BURBANK	UPWIND AREA MAX	UPWIND AREA MAX PREVIOUS DAY
9/1	4	9	9	18	18	
9/2	6	16	24	22	24	18
9/3	8	13	14	19	19	24
9/4	6	10	13	20	20	19
9/5	11	15	18	22	22	20
9/6	7	9	13	27	27	22
9/7	5	12	16	13	16	27
9/8	4	7	11	14	14	16
9/9	7	14	7	15	15	14
9/10	14	23	17	19	23	15
9/11	18	19	13	20	20	23
9/12	7	11	20	15	20	20
9/13	8	14	20	22	22	20
9/14	6	16	18	25	25	22
9/15	7	11	9	28	28	25
9/16	6	12	16	28	28	28
9/17	10	19	16	23	23	28
9/18	12	20	19	22	22	23
9/19	4	11	12	11	12	22
9/20	2	3	8	5	8	12
9/21	3	5	10	10	10	8
9/22	3	4	9	7	9	10
9/23	4	6	10	9	10	9
9/24	4	6	11	8	11	10
9/25	5	11	10	14	14	11
9/26	4	4	4	5	5	14
9/27	3	5	7	5	7	7
9/28	3	4	4	3	4	7
9/29	3	3	3	3	3	4
9/30	1	1	1	2	3	3
10/1	3	3	5	4	5	3
10/2	4	5	5	7	7	5
10/3	8	12	7	11	12	7
10/4	4	7	11	16	16	12
10/5	3	4	8	5	8	16
10/6	10	11	13	13	12	8

TABLE A-3 ADDITIONAL AIR QUALITY AND METEOROLOGY DATA

DATE	VANDENBERG 0400 PST 850 MB TEMP, °C	Bkg O3 Aloft (pphm)	CALCULATED MAX MIX	HEIGHT(FT MSL)	MAX O3	
					IN ELEVATED LAYERS(pphm)	PT. MUGU 3000' 10 PST WIND DIR.(°)
9/1	17.3				10	
9/2	21.4	3		2300	10	273
9/3	21.8	5		1750	16	
9/4	18.1	5			16	
9/5	21.4	7		2200	15	
9/6	23			2800		128
9/7	21.7	4		2100	19	
9/8	18.4	3		2000	9	152
9/9	19.8	3		2600		158
9/10	23.5	3				
9/11	24.5	5			18	
9/12	25.5	7		1600	16	132
9/13	25.6			2200		120
9/14	24.6	6		2200	19	230
9/15	25.6	6		1400	17	128
9/16	24.4	7		2500	27	88
9/17	22.8	9		2050	17	135
9/18	22.1	8		2400	19	78
9/19	22.5			1850		120
9/20	21.2	5		2950	10	78
9/21		2		3300		117
9/22	14.8	1		1750		167
9/23	13.4	3		3250		113
9/24	13.2					
9/25	13.7			3800		111
9/26	7.9	4		3800		231
9/27	10.3			4000		
9/28	10.2			1300		
9/29	8.8			200		
9/30	6.3			1200		
10/1	7.2					
10/2	8.1					
10/3	10.6	6				
10/4	15.3	5		2200		
10/5	13.5	5		2300		
10/6	14.3			3500		

APPENDIX B

AIR QUALITY AND UPPER AIR DATA FOR JUNE-OCTOBER, 1980-1983

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds	
	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
6/ 1/80	-	7	5	6	6	6	6	5	8	4	4	1484	9.5	-	-
6/ 2/80	-	6	5	6	6	6	5	4	6	3	4	1469	12.4	119	6
6/ 3/80	-	7	5	7	7	7	6	7	8	3	5	1429	9.8	132	3
6/ 4/80	-	9	4	7	8	8	5	8	11	4	8	1496	8.4	0	0
6/ 5/80	-	6	4	6	5	6	5	6	7	3	5	1483	8.1	136	3
6/ 6/80	-	7	6	6	8	6	7	10	10	5	9	1489	9.4	100	3
6/ 7/80	-	10	8	10	10	9	5	13	15	9	10	1512	10.6	-	-
6/ 8/80	-	11	7	9	10	12	6	19	18	9	15	1540	15.1	-	-
6/ 9/80	-	10	8	9	11	10	6	20	20	4	10	1528	16.4	149	2
6/10/80	-	11	7	8	9	9	5	10	12	5	10	1499	15.7	257	5
6/11/80	-	11	4	7	10	11	5	15	14	5	8	1510	15.8	309	4
6/12/80	-	11	8	7	9	9	6	10	8	5	12	1524	10.7	203	1
6/13/80	-	7	5	6	10	9	5	12	12	4	9	1518	10.8	259	3
6/14/80	-	8	6	8	9	9	5	11	10	5	10	1515	10.8	-	-
6/15/80	-	9	7	10	9	9	6	23	23	10	17	1529	15.0	-	-
6/16/80	-	10	6	10	10	12	5	16	23	5	6	1515	18.5	0	0
6/17/80	-	13	7	9	9	12	6	13	14	4	7	1497	19.5	129	6
6/18/80	-	10	5	9	9	12	7	16	15	8	11	1513	18.4	295	2
6/19/80	-	12	5	10	10	13	6	20	15	2	10	1512	18.3	127	2
6/20/80	-	10	5	10	11	13	3	17	12	1	10	1508	17.9	158	4
6/21/80	-	12	8	13	10	13	-	20	16	3	11	1516	15.7	-	-
6/22/80	-	12	9	13	8	12	-	20	19	5	16	1513	15.9	-	-
6/23/80	-	8	6	8	8	10	-	11	11	-	8	1510	14.8	263	3
6/24/80	-	12	6	10	7	11	-	11	10	-	9	1490	14.0	113	5
6/25/80	-	13	6	10	10	9	5	17	16	4	8	1506	15.3	294	3
6/26/80	-	13	10	13	11	11	5	21	21	7	17	1518	16.5	304	2
6/27/80	-	18	12	17	15	18	6	35	21	9	21	1530	23.3	115	7
6/28/80	-	10	7	8	10	12	8	12	13	8	11	1529	23.2	-	-
6/29/80	-	9	4	7	9	10	4	19	13	2	13	1526	21.2	-	-
6/30/80	-	15	3	8	8	8	4	13	16	3	7	1510	20.0	278	16
7/ 1/80	-	7	4	6	6	8	3	4	6	1	3	1523	18.5	110	17
7/ 2/80	-	8	2	-	5	6	3	7	9	2	3	1540	12.4	125	15
7/ 3/80	-	7	4	-	7	8	4	11	11	7	8	1554	13.4	284	7
7/ 4/80	-	10	6	1	10	11	4	21	21	6	13	1530	16.8	-	-
7/ 5/80	-	10	5	8	10	11	4	21	20	-	17	1522	16.9	-	-
7/ 6/80	-	14	6	10	1	13	4	17	13	-	9	1516	17.1	-	-
7/ 7/80	-	13	6	9	9	10	4	13	12	6	9	1503	17.4	179	1
7/ 8/80	-	10	5	6	6	8	3	12	9	4	8	1510	15.9	249	2
7/ 9/80	-	7	4	6	5	7	3	13	11	4	11	1516	14.7	297	8
7/10/80	-	7	4	7	7	8	4	13	12	5	12	1530	19.8	291	4
7/11/80	-	8	4	9	9	12	4	24	23	5	20	1536	21.8	298	15
7/12/80	-	10	5	6	10	12	3	13	10	5	8	1519	19.5	-	-
7/13/80	-	12	8	10	10	12	6	12	12	1	11	1515	15.6	-	-
7/14/80	-	11	6	8	8	8	6	13	10	7	12	1532	16.2	122	3
7/15/80	-	7	4	7	7	8	4	17	18	6	13	1535	17.4	160	3

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds	
	Rocketdyne	Simi Valley	Thousand Oaks	El Rio	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
7/16/80	-	7	3	7	10	9	3	15	14	4	8	1560	22.1	295	12
7/17/80	-	13	5	7	10	12	3	16	20	3	11	1544	23.6	288	7
7/18/80	-	12	7	9	13	13	4	14	19	3	7	1511	22.6	184	4
7/19/80	-	17	12	13	14	16	6	16	16	4	8	1507	23.1	-	-
7/20/80	-	16	8	10	10	12	7	21	18	7	12	1504	22.1	-	-
7/21/80	-	12	7	10	8	12	6	15	22	5	7	1517	23.3	0	0
7/22/80	-	17	7	12	11	13	6	19	19	3	8	1530	24.7	100	2
7/23/80	-	17	6	13	15	15	5	17	18	4	10	1531	26.4	196	2
7/24/80	-	17	4	10	15	15	5	15	20	4	8	1510	25.8	276	3
7/25/80	-	-	7	13	17	17	5	19	19	4	12	1513	26.8	159	4
7/26/80	-	-	7	11	17	15	6	19	23	3	7	1516	26.6	-	-
7/27/80	-	-	6	10	11	12	5	17	21	4	9	1516	26.2	-	-
7/28/80	-	-	7	12	13	13	5	19	21	3	8	1508	26.7	276	8
7/29/80	-	-	8	14	15	12	5	34	24	5	16	1514	25.0	240	1
7/30/80	-	-	5	9	7	11	5	14	11	7	13	1535	25.8	271	11
7/31/80	-	-	8	10	13	13	7	16	18	4	11	1541	23.7	0	0
8/1/80	-	-	10	14	12	15	6	22	22	8	11	1551	23.9	128	4
8/2/80	-	-	2	11	13	15	6	12	14	4	7	1545	24.3	-	-
8/3/80	-	-	8	11	12	5	10	12	4	5	-	1520	26.9	-	-
8/4/80	-	-	9	11	10	6	9	13	4	6	-	1481	23.1	116	7
8/5/80	-	-	5	7	8	10	5	12	11	3	7	1477	21.3	117	5
8/6/80	-	-	5	10	9	11	6	9	9	7	9	1493	22.5	146	5
8/7/80	-	-	8	11	11	11	5	18	21	5	9	1509	24.0	283	4
8/8/80	-	-	6	10	13	14	5	26	23	4	13	1494	25.2	307	8
8/9/80	-	-	8	15	17	18	7	29	30	5	-	1491	26.2	-	-
8/10/80	-	-	7	12	17	17	6	24	17	9	-	1498	26.6	-	-
8/11/80	-	-	11	13	18	16	5	19	30	10	12	1505	27.5	182	2
8/12/80	-	3	12	14	17	17	5	10	19	3	8	1501	27.5	71	2
8/13/80	-	7	6	7	9	9	6	5	11	3	4	1491	24.3	127	14
8/14/80	-	6	6	6	7	7	6	7	10	4	6	1481	19.8	130	10
8/15/80	-	6	6	6	7	7	5	7	9	3	5	1483	16.9	99	4
8/16/80	-	6	5	5	7	7	5	6	11	3	5	1494	17.1	-	-
8/17/80	-	8	6	9	7	9	5	11	15	4	6	1493	17.6	-	-
8/18/80	-	5	4	5	6	5	5	5	8	3	3	1473	14.9	126	11
8/19/80	-	4	4	5	5	6	4	6	8	3	4	1473	9.4	104	9
8/20/80	-	8	3	6	6	7	4	8	13	3	5	1522	15.1	48	4
8/21/80	-	10	6	9	9	9	5	10	14	5	8	1523	18.6	106	3
8/22/80	-	10	6	6	8	10	8	9	12	5	7	1481	17.3	121	12
8/23/80	-	7	7	7	10	10	7	9	9	4	6	-	-	-	-
8/24/80	-	6	6	7	8	9	5	8	6	5	6	1510	14.9	-	-
8/25/80	-	8	7	7	9	10	6	7	7	5	9	1526	16.4	113	5
8/26/80	-	6	7	6	8	7	6	10	11	4	7	1532	18.2	141	3
8/27/80	-	8	7	8	9	11	6	11	12	4	6	1528	18.3	136	2
8/28/80	-	11	8	9	9	12	6	17	9	8	11	1526	17.1	151	6
8/29/80	-	10	9	10	13	9	6	12	11	6	13	1538	19.0	257	6
8/30/80	-	5	6	7	12	9	4	10	8	3	8	1544	7.1	-	-

Date	Rocketdyne	Daily Maximum Ozone (pphm)										Vandenberg AFB			Pt. Mugu	
		Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)	
8/31/80	-	7	7	8	10	11	5	10	13	5	8	1510	14.7	108	10	
9/ 1/80	-	11	8	8	10	11	5	14	16	6	10	1499	17.4	-	-	
9/ 2/80	-	10	9	7	9	12	8	15	17	5	11	1502	18.1	106	4	
9/ 3/80	-	14	10	12	13	13	10	24	19	8	15	1506	18.8	102	9	
9/ 4/80	-	14	11	13	14	14	10	19	23	7	11	1520	20.1	146	7	
9/ 5/80	-	11	10	11	13	12	8	14	16	4	9	1537	21.4	132	5	
9/ 6/80	-	7	7	8	9	13	6	10	8	5	7	1530	19.9	-	-	
9/ 7/80	-	5	7	6	7	8	7	5	7	3	4	1493	16.3	-	-	
9/ 8/80	-	7	6	6	7	9	5	5	8	4	5	1481	10.9	0	0	
9/ 9/80	-	7	-	6	9	10	5	6	11	4	5	1509	13.6	58	4	
9/10/80	-	9	-	7	9	10	6	10	14	5	8	1523	16.5	28	8	
9/11/80	-	11	9	9	11	12	8	19	20	8	13	1517	16.9	186	1	
9/12/80	-	14	11	12	13	16	9	18	19	8	13	1496	17.8	132	4	
9/13/80	-	8	8	7	8	8	8	7	9	4	6	1485	17.1	-	-	
9/14/80	-	6	5	7	7	7	6	7	8	4	5	1481	8.5	-	-	
9/15/80	-	8	6	6	8	8	6	9	10	3	6	1489	13.9	113	7	
9/16/80	-	7	5	8	8	9	5	13	10	4	8	1500	13.2	301	9	
9/17/80	-	6	6	7	9	7	6	26	20	9	20	1523	19.6	188	4	
9/18/80	-	4	4	4	7	7	2	10	6	2	3	1514	15.6	209	5	
9/19/80	-	5	5	5	7	7	4	7	9	3	6	1519	11.7	0	0	
9/20/80	-	7	8	11	9	13	8	12	13	5	8	1511	14.5	-	-	
9/21/80	-	7	7	9	8	10	5	13	14	7	11	1487	14.6	-	-	
9/22/80	-	10	8	9	10	11	8	13	15	4	9	1498	15.5	78	11	
9/23/80	-	7	9	8	11	10	9	13	14	4	8	1526	20.0	54	22	
9/24/80	-	10	8	10	9	11	9	17	19	10	14	1511	20.3	52	20	
9/25/80	-	10	6	12	14	12	6	18	18	5	12	1490	23.8	66	5	
9/26/80	-	15	6	11	14	16	6	21	24	6	8	1501	21.0	292	5	
9/27/80	-	8	5	9	10	16	5	17	22	5	9	1506	22.1	-	-	
9/28/80	-	7	9	11	10	12	7	19	17	8	12	1497	20.0	-	-	
9/29/80	-	12	8	11	12	16	8	21	21	7	9	1518	23.2	99	10	
9/30/80	-	11	12	16	9	14	9	25	22	6	13	1559	25.0	60	17	
10/ 1/80	-	11	11	15	9	15	7	24	13	5	11	1553	25.3	53	13	
10/ 2/80	-	17	13	19	15	21	13	29	38	8	17	1553	27.0	62	20	
10/ 3/80	-	17	12	17	15	19	11	25	33	8	16	1556	27.4	53	6	
10/ 4/80	-	9	12	12	16	15	11	25	27	8	16	1547	26.2	-	-	
10/ 5/80	-	7	10	12	13	14	7	16	16	8	10	1552	23.8	-	-	
10/ 6/80	-	12	8	13	11	13	7	16	21	7	8	1554	24.2	302	5	
10/ 7/80	-	14	10	15	13	15	10	26	27	10	13	1555	23.4	66	12	
10/ 8/80	-	14	9	13	13	13	11	17	23	4	10	1536	24.7	352	3	
10/ 9/80	-	15	11	15	13	16	9	19	21	8	14	1521	22.5	247	3	
10/10/80	-	14	9	12	15	17	9	21	23	7	13	1520	22.1	294	8	
10/11/80	-	13	16	9	15	7	4	21	23	9	17	1520	16.7	-	-	
10/12/80	-	7	13	9	12	7	7	15	17	10	13	1514	15.2	-	-	
10/13/80	-	7	7	7	7	6	5	6	4	6	6	1502	10.5	-	-	
10/14/80	-	-	-	5	5	7	4	4	4	3	5	1492	5.8	245	4	
10/15/80	-	-	-	5	5	5	4	3	5	3	4	1463	3.3	343	3	

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB			Pt. Mugu		
	Simi Valley					Thousand Oaks					0400 PST Sounding			1000 PST		
	Rocketdyne	El Rio	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	850 mb	3000 ft. winds	Dir (°)	Spd (kts)			
10/16/80	-	-	6	6	7	6	4	6	5	1457	4.6	164	5			
10/17/80	-	-	7	6	7	7	-	6	6	1494	5.4	45	5			
10/18/80	-	-	5	5	6	4	-	4	5	1536	9.4	-	-			
10/19/80	-	-	5	5	6	4	-	6	4	1554	14.4	-	-			
10/20/80	-	-	6	7	4	6	6	7	8	1553	15.5	0	0			
10/21/80	-	-	6	11	-	4	7	8	8	1544	16.6	306	1			
10/22/80	-	-	9	10	-	-	7	13	12	6	1516	15.0	249	1		
10/23/80	-	-	7	11	-	-	8	14	14	5	1531	17.2	55	7		
10/24/80	-	10	8	12	-	-	7	12	10	10	1569	16.8	138	6		
10/25/80	-	3	5	5	-	-	5	7	9	5	1528	14.2	-	-		
10/26/80	-	3	5	5	-	-	4	5	6	3	1480	7.0	-	-		
10/27/80	-	4	5	5	-	-	5	6	3	4	1530	10.5	4	8		
10/28/80	-	3	5	4	-	-	5	3	3	4	1559	12.4	66	28		
10/29/80	-	3	5	4	-	-	7	4	3	5	1586	13.4	83	9		
10/30/80	-	3	6	-	-	-	6	5	4	3	1574	17.1	89	2		
10/31/80	-	5	6	-	-	-	6	4	6	3	1558	16.2	133	12		
6/1/81	12	13	8	-	10	14	7	12	13	5	1468	16.9	105	3		
6/2/81	9	10	7	-	8	11	6	8	11	6	1485	17.6	79	1		
6/3/81	11	12	8	-	10	14	8	15	18	7	1494	15.6	32	17		
6/4/81	12	6	13	-	13	15	15	19	14	10	1504	22.2	63	31		
6/5/81	20	17	12	-	13	19	9	16	18	9	1504	24.6	333	2		
6/6/81	14	13	9	-	9	13	8	17	16	8	1499	22.3	-	-		
6/7/81	12	11	8	-	11	12	7	17	15	10	1512	19.1	-	-		
6/8/81	13	12	7	-	11	12	6	22	15	9	1528	19.9	338	3		
6/9/81	11	8	5	-	8	10	4	13	12	6	1526	20.8	303	16		
6/10/81	11	10	6	-	8	10	5	15	18	7	1496	19.5	292	1		
6/11/81	11	10	7	-	10	10	6	10	11	7	1488	16.8	294	14		
6/12/81	10	9	7	-	9	10	6	10	11	7	1487	12.2	306	6		
6/13/81	6	-	6	-	6	8	6	7	5	6	1505	11.5	-	-		
6/14/81	5	-	5	-	6	7	6	14	5	12	1497	13.4	-	-		
6/15/81	6	4	5	-	7	8	6	13	4	8	1533	19.3	58	34		
6/16/81	11	10	9	-	9	11	10	12	12	13	1548	23.2	99	9		
6/17/81	14	11	10	-	10	13	6	16	14	19	1534	22.9	217	3		
6/18/81	21	20	16	-	17	18	12	24	17	10	1505	22.4	71	10		
6/19/81	20	15	9	-	16	16	9	15	13	5	1512	23.1	0	0		
6/20/81	13	13	10	-	16	-	10	21	18	10	1531	24.3	-	-		
6/21/81	15	13	7	-	13	-	8	14	12	5	1542	23.8	-	-		
6/22/81	11	13	5	-	13	-	5	15	19	2	1522	24.7	157	1		
6/23/81	15	14	-	-	14	-	7	17	19	5	1514	24.7	241	3		
6/24/81	16	17	6	-	14	-	5	21	14	8	1505	24.0	253	3		
6/25/81	16	16	6	-	13	-	5	19	17	4	1520	21.7	170	5		
6/26/81	13	12	6	-	13	-	6	12	13	4	1529	23.6	116	4		
6/27/81	17	16	7	-	16	-	10	13	13	6	1501	23.8	-	-		
6/28/81	15	15	7	-	11	14	7	12	12	5	1478	21.2	-	-		
6/29/81	10	9	5	-	13	18	5	11	11	5	1508	21.6	102	4		
6/30/81	10	9	5	-	7	13	6	12	12	5	1521	23.2	280	10		

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds	
	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
7/ 1/81	14	13	6	-	10	12	7	11	11	3	8	1507	21.9	268	4
7/ 2/81	8	8	10	-	10	13	8	18	10	5	12	1495	19.0	118	14
7/ 3/81	6	5	7	-	5	8	6	7	6	4	7	1527	23.1	-	-
7/ 4/81	19	7	11	-	10	13	10	12	13	4	9	1534	25.1	-	-
7/ 5/81	13	9	7	-	11	10	6	11	12	8	9	1535	23.2	-	-
7/ 6/81	13	9	8	-	9	11	11	9	13	4	8	1511	21.2	189	5
7/ 7/81	11	8	11	-	9	11	8	9	10	3	6	1497	20.3	144	4
7/ 8/81	12	6	6	-	9	12	5	8	9	3	5	1507	20.7	120	7
7/ 9/81	8	7	8	-	8	9	8	12	8	4	5	1543	20.4	149	1
7/10/81	11	9	9	-	11	13	9	14	8	5	11	1526	20.3	157	2
7/11/81	12	11	8	-	10	13	6	18	19	10	13	1517	18.6	-	-
7/12/81	15	12	8	-	10	13	6	16	14	13	15	1516	18.9	-	-
7/13/81	16	12	11	-	12	15	6	20	17	10	16	1521	19.7	97	5
7/14/81	16	12	11	-	13	14	11	20	21	5	12	1525	21.8	140	4
7/15/81	16	10	10	-	15	15	8	21	19	6	13	1519	23.0	144	4
7/16/81	13	6	10	-	12	13	6	16	16	5	12	1506	23.2	223	3
7/17/81	14	10	7	-	11	14	6	19	17	8	15	1505	21.4	322	1
7/18/81	12	10	9	-	11	12	6	17	14	8	11	1511	21.0	-	-
7/19/81	13	9	7	-	11	12	6	14	14	8	12	1519	22.5	-	-
7/20/81	13	10	6	-	11	13	6	17	14	5	9	1539	22.1	178	2
7/21/81	15	15	7	-	11	13	5	12	10	4	8	1529	23.7	190	5
7/22/81	14	10	7	-	11	14	7	14	9	3	8	1525	24.4	82	4
7/23/81	16	12	8	-	12	15	6	21	17	9	13	1518	25.1	317	1
7/24/81	13	14	6	-	10	15	5	18	21	8	13	1512	24.0	5	2
7/25/81	17	12	8	-	15	16	7	19	17	10	13	1499	24.3	-	-
7/26/81	13	13	8	-	10	12	7	14	15	5	9	1502	21.6	-	-
7/27/81	11	9	7	-	11	13	7	13	14	5	7	1518	22.3	118	5
7/28/81	12	10	8	-	10	13	7	12	17	5	7	1527	23.1	104	2
7/29/81	12	10	8	-	11	14	7	13	14	5	8	1515	22.5	194	6
7/30/81	14	12	9	-	11	15	6	19	19	7	12	1514	20.9	72	3
7/31/81	13	11	9	-	11	14	6	19	20	9	13	1521	21.1	88	2
8/ 1/81	15	11	-	-	11	14	5	22	22	9	15	1538	20.2	-	-
8/ 2/81	14	12	-	-	11	14	5	17	14	9	13	1532	19.6	-	-
8/ 3/81	12	11	3	-	10	14	4	17	18	7	12	1509	18.1	145	1
8/ 4/81	21	14	9	-	11	15	6	17	22	6	10	1504	19.2	157	2
8/ 5/81	22	11	9	-	13	16	7	22	25	7	13	1518	20.9	-	-
8/ 6/81	24	15	9	-	15	15	7	20	23	8	11	1531	24.8	104	3
8/ 7/81	22	11	8	-	14	15	7	19	19	4	13	1542	26.1	247	7
8/ 8/81	23	12	8	-	15	15	6	15	17	5	9	1519	27.8	-	-
8/ 9/81	22	12	10	-	15	14	6	22	16	7	12	1513	27.6	-	-
8/10/81	18	9	9	-	10	13	7	11	10	3	6	1524	26.6	120	7[B
8/11/81	20	10	-	-	12	13	6	11	11	5	9	1536	23.1	0	0
8/12/81	20	10	-	-	10	11	6	15	14	4	9	1506	21.3	127	6
8/13/81	21	11	6	-	10	12	8	17	16	4	9	1473	20.5	121	8
8/14/81	18	8	6	-	9	10	5	11	9	4	6	1506	21.6	127	11
8/15/81	17	8	6	-	6	8	5	10	13	4	6	1548	21.3	-	-

Daily Maximum Ozone (pphm)

Vandenberg AFB
0400 PST Sounding
850 mb

Pt. Mugu
1000 PST
3000 ft. winds

Date	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
8/16/81	19	9	6	-	10	12	5	11	13	8	8	1550	20.9	-	-
8/17/81	21	11	7	-	9	14	5	10	14	3	6	1512	23.5	123	4
8/18/81	21	11	6	-	13	15	5	9	11	3	6	1485	22.2	118	11
8/19/81	13	11	8	-	10	11	7	14	20	6	10	1508	18.6	113	2
8/20/81	10	10	7	-	10	11	5	24	19	10	19	1515	19.6	219	1
8/21/81	13	9	7	-	10	9	5	15	15	11	17	1504	18.3	135	1
8/22/81	18	13	7	-	11	-	5	22	16	10	17	1499	21.8	-	-
8/23/81	14	11	7	-	9	-	6	16	15	6	8	1504	18.7	-	-
8/24/81	13	9	5	-	9	11	4	14	16	6	12	1489	21.9	160	7
8/25/81	9	8	6	-	6	8	6	14	15	10	15	1507	24.0	142	5
8/26/81	8	5	5	-	11	10	4	16	9	9	12	1525	23.8	291	2
8/27/81	14	10	-	-	13	15	4	16	20	11	22	1507	24.3	327	3
8/28/81	8	7	5	-	9	8	5	23	16	4	13	1478	25.2	182	5
8/29/81	15	11	6	-	12	13	6	15	17	7	9	1476	25.1	-	-
8/30/81	16	11	7	-	11	15	6	13	13	8	10	1486	22.6	-	-
8/31/81	16	12	7	-	12	15	6	12	12	4	7	1468	22.0	-	-
9/1/81	15	13	6	-	13	16	9	18	13	4	8	-	-	115	12
9/2/81	15	13	9	-	10	16	10	16	11	5	10	1477	20.9	124	8
9/3/81	9	12	8	-	11	14	8	12	13	4	8	1477	20.2	129	6
9/4/81	10	10	7	-	10	10	7	14	20	5	8	1484	20.4	131	3
9/5/81	12	12	-	-	9	7	8	10	11	4	6	1476	21.7	-	-
9/6/81	11	11	-	-	10	-	6	13	10	5	8	1484	19.7	-	-
9/7/81	11	11	-	-	11	-	6	14	12	6	7	1520	17.5	-	-
9/8/81	8	7	6	-	8	-	6	11	2	6	11	1545	19.8	120	1
9/9/81	6	5	5	-	7	7	6	12	-	4	12	1544	20.6	270	8
9/10/81	12	11	9	-	9	12	8	11	7	3	8	1515	20.8	125	6
9/11/81	16	15	10	-	12	14	10	16	12	5	13	1525	21.9	106	10
9/12/81	12	10	7	-	9	10	6	17	21	5	11	1539	21.8	-	-
9/13/81	13	12	6	-	8	9	6	13	14	5	9	1543	20.1	-	-
9/14/81	10	10	6	-	9	10	5	13	14	4	8	1535	20.1	128	2
9/15/81	12	11	6	-	11	11	5	16	17	4	7	1522	22.6	305	6
9/16/81	17	16	7	-	12	13	5	23	21	4	7	1540	22.2	-	-
9/17/81	18	12	6	-	10	12	4	27	16	5	12	1542	22.5	27	5
9/18/81	21	23	14	-	20	18	6	15	18	9	17	1556	23.0	0	0
9/19/81	17	17	14	-	14	15	11	16	11	4	16	1544	23.1	-	-
9/20/81	12	12	7	-	12	12	6	13	7	12	13	1523	21.8	-	-
9/21/81	18	15	10	-	12	13	10	16	13	8	14	1513	18.7	85	4
9/22/81	19	16	14	-	11	13	11	13	13	3	9	1503	18.0	90	5
9/23/81	9	9	7	-	9	-	8	9	9	5	6	1509	17.5	119	4
9/24/81	9	9	7	-	8	-	7	12	10	5	8	1522	15.4	267	2
9/25/81	11	11	7	-	10	9	7	13	11	6	10	1532	13.3	295	7
9/26/81	13	13	9	-	9	10	7	15	18	6	7	1526	18.1	-	-
9/27/81	13	13	9	-	11	11	8	17	14	9	9	1521	16.7	-	-
9/28/81	12	10	4	-	8	7	6	12	13	7	9	1512	16.7	342	1
9/29/81	7	7	4	-	6	5	5	4	6	2	3	1485	14.1	143	9
9/30/81	9	8	8	-	7	9	5	6	9	5	6	1482	13.1	66	15

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds	
	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
10/ 1/81	5	4	4	-	5	5	4	3	3	2	4	1492	15.1	92	13
10/ 2/81	7	6	5	-	5	5	5	3	5	4	5	1499	12.5	235	5
10/ 3/81	6	5	5	-	4	4	4	5	5	5	4	1470	11.6	-	-
10/ 4/81	8	7	4	-	5	5	4	6	9	3	4	1448	11.3	-	-
10/ 5/81	10	9	7	-	8	6	6	9	12	6	7	1474	10.3	84	3
10/ 6/81	10	10	7	-	9	8	5	7	7	7	12	1513	16.4	125	10
10/ 7/81	10	9	5	-	9	9	4	8	10	3	7	1479	14.2	303	8
10/ 8/81	6	6	5	-	6	5	5	7	7	5	6	1453	10.6	302	7
10/ 9/81	10	5	8	-	10	9	8	8	10	3	5	1474	12.8	0	0
10/10/81	7	-	7	-	9	7	6	5	7	6	5	1487	11.5	-	-
10/11/81	4	-	3	-	4	4	3	3	4	4	3	1459	4.1	-	-
10/12/81	6	-	4	-	5	4	4	4	5	4	4	1460	5.6	-	-
10/13/81	7	-	4	-	6	5	5	4	6	4	5	1456	3.9	109	4
10/14/81	6	-	5	-	7	5	6	5	6	5	5	1503	5.4	314	2
10/15/81	7	-	6	-	6	5	7	6	6	5	6	1505	5.4	39	11
10/16/81	7	-	8	-	6	5	6	5	6	5	6	1533	7.4	315	3
10/17/81	5	-	5	-	7	4	6	7	3	5	6	1554	12.4	-	-
10/18/81	4	-	3	-	6	4	4	7	3	5	5	1571	17.0	-	-
10/19/81	5	-	4	-	5	4	5	5	4	4	4	1577	17	59	13
10/20/81	10	-	8	-	8	6	6	10	10	4	6	1551	16.7	77	9
10/21/81	12	-	10	-	10	8	9	10	11	7	5	1538	16.8	308	1
10/22/81	12	-	7	-	9	9	6	9	8	6	8	1567	16.3	79	10
10/23/81	6	-	6	-	6	5	6	7	6	2	5	1568	17.8	25	6
10/24/81	10	-	9	-	8	8	5	8	8	-	6	1525	16.0	-	-
10/25/81	15	-	10	-	10	-	7	9	11	-	7	1475	16.5	-	-
10/26/81	6	-	6	-	6	3	3	3	5	5	4	1489	12.3	129	7
10/27/81	7	-	6	-	7	5	3	4	5	3	4	1505	4.5	296	6
10/28/81	3	-	3	-	3	-	3	2	1	2	2	1491	8.1	195	7
10/29/81	4	-	4	-	4	-	3	3	4	3	3	1477	3.8	333	16
10/30/81	4	-	4	-	4	4	4	5	3	2	3	1531	7.1	74	30
10/31/81	4	-	4	-	5	4	4	5	4	2	4	1580	15.4	-	-
6/ 1/82	8	6	6	7	10	8	7	8	7	5	7	1484	9.7	243	2
6/ 2/82	7	7	6	7	8	7	7	6	7	4	5	1476	9.6	224	1
6/ 3/82	9	8	6	7	9	8	7	12	11	5	10	1507	12.1	311	8
6/ 4/82	8	8	6	8	10	7	7	9	10	4	7	1511	12.3	0	0
6/ 5/82	8	-	6	7	10	-	7	7	8	5	7	1485	8.7	-	-
6/ 6/82	9	-	6	8	9	-	8	9	10	5	8	1490	9.8	-	-
6/ 7/82	9	6	5	7	9	-	6	7	8	4	6	1495	10.3	111	4
6/ 8/82	9	11	6	7	8	9	8	7	11	3	5	1499	12.1	81	3
6/ 9/82	11	10	6	7	8	10	7	8	10	3	6	1488	15.8	84	4
6/10/82	8	9	8	7	8	10	8	8	10	4	6	1500	15.0	19	2
6/11/82	11	12	8	10	9	10	8	9	12	4	9	1494	17.5	113	3
6/12/82	10	11	7	8	8	8	7	8	8	5	8	1479	15.2	-	-
6/13/82	9	10	7	7	9	9	6	7	8	4	5	1482	12.2	-	-
6/14/82	10	9	6	7	9	10	7	6	8	3	5	1478	13.8	68	4
6/15/82	9	10	7	7	10	8	8	10	10	3	8	1488	17.7	56	7

Date	Rocketdyne	Daily Maximum Ozone (pphm)										Vandenberg AFB			Pt. Mugu	
		Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	0400 PST Sounding	850 mb	1000 PST	3000 ft. winds	
6/16/82	-	13	7	8	10	10	7	9	13	4	8	1489	18.8	0	0	
6/17/82	8	8	6	6	7	6	5	3	5	3	5	1471	20.9	121	11	
6/18/82	4	5	4	5	5	4	5	2	3	2	3	1465	18.6	112	12	
6/19/82	10	11	7	8	7	8	6	9	12	3	6	1488	19.2	-	-	
6/20/82	8	10	4	7	7	8	6	9	9	5	7	1479	19.3	-	-	
6/21/82	10	13	6	6	8	9	6	7	13	4	6	1480	18.3	134	6	
6/22/82	10	13	7	8	9	9	7	7	9	4	7	1509	17.8	-	-	
6/23/82	9	14	10	8	9	8	7	9	9	4	7	1514	17.6	237	1	
6/24/82	11	11	6	8	10	8	5	11	12	3	7	1505	13.6	314	3	
6/25/82	13	11	6	6	10	7	7	15	17	8	11	1514	14.9	293	6	
6/26/82	15	14	6	9	10	9	3	19	18	4	8	1521	15.7	-	-	
6/27/82	10	11	7	9	8	8	3	14	13	5	12	1512	16.0	-	-	
6/28/82	5	8	4	6	6	6	3	7	6	4	7	1477	14.7	173	5	
6/29/82	6	9	4	6	5	4	3	2	5	2	3	1445	10.7	97	5	
6/30/82	4	8	5	4	6	4	3	2	3	2	3	1448	6.9	237	4	
7/1/82	9	8	7	9	7	7	4	8	11	3	5	1487	12.1	0	0	
7/2/82	14	14	8	13	10	9	6	11	11	5	6	1516	16.2	117	5	
7/3/82	14	13	9	12	-	8	7	11	8	8	11	1527	17.0	48	2	
7/4/82	12	10	7	11	-	7	6	12	11	7	10	1512	13.9	-	-	
7/5/82	9	8	8	10	-	7	5	9	10	3	6	1495	14.0	-	-	
7/6/82	10	9	8	10	10	9	5	10	6	4	7	1494	15.6	104	10	
7/7/82	13	13	7	8	11	11	8	12	9	4	10	1506	15.6	138	7	
7/8/82	12	12	8	10	11	9	8	11	8	5	8	1514	15.9	152	3	
7/9/82	13	13	9	11	13	10	5	15	19	4	8	1520	17.9	171	6	
7/10/82	14	13	10	12	14	13	9	18	19	12	11	1527	18.7	-	-	
7/11/82	13	12	8	12	13	11	12	17	16	-	13	1512	20.2	-	-	
7/12/82	18	17	11	14	15	15	10	20	17	5	10	1518	20.6	141	3	
7/13/82	13	11	8	9	11	12	8	22	17	6	12	1526	22.1	206	2	
7/14/82	17	15	9	11	13	13	8	20	14	7	10	1506	22.6	283	1	
7/15/82	19	17	9	9	14	12	12	13	13	3	6	1473	21.9	143	9	
7/16/82	14	13	9	11	12	12	7	10	11	5	8	1488	19.9	92	6	
7/17/82	14	14	8	12	10	11	7	16	14	8	11	1491	17.6	-	-	
7/18/82	12	11	5	9	8	9	5	15	14	7	10	1499	18.6	-	-	
7/19/82	10	10	6	8	11	9	5	19	16	6	10	1516	21.5	279	7	
7/20/82	12	11	5	9	11	2	5	18	13	5	10	1527	23.1	314	20	
7/21/82	19	17	7	12	14	-	5	21	16	4	11	1532	22.8	179	1	
7/22/82	17	15	7	12	14	13	5	23	20	3	14	1536	23.3	290	2	
7/23/82	20	16	7	11	16	13	5	19	17	4	10	1522	22.2	136	5	
7/24/82	16	13	6	10	14	13	5	14	14	4	10	1509	21.8	-	-	
7/25/82	14	14	6	9	11	12	5	12	14	5	7	1517	21.6	-	-	
7/26/82	14	13	5	9	12	12	5	15	19	4	9	1526	20.7	106	5	
7/27/82	13	13	6	8	12	11	6	12	10	3	7	1539	20.5	101	4	
7/28/82	8	8	5	7	9	9	5	9	10	3	5	1565	21.1	273	3	
7/29/82	15	16	7	9	14	12	5	15	14	2	6	1543	25.0	0	0	
7/30/82	20	22	6	10	15	13	5	17	14	4	6	1541	27.4	157	4	
7/31/82	18	18	9	12	15	14	8	15	13	4	12	1561	26.7	-	-	

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds	
	Rocketdyne	Simi Valley	Thousand Oaks	Ej Rio	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
8/ 1/82	16	17	7	11	11	11	7	16	15	6	10	1533	25.7	-	-
8/ 2/82	10	12	6	7	11	11	5	12	13	5	10	1489	21.0	234	2
8/ 3/82	12	14	5	7	9	8	6	11	10	5	8	1493	17.8	70	1
8/ 4/82	13	14	6	4	11	9	5	18	10	10	11	1512	17.9	314	1
8/ 5/82	11	12	8	10	11	10	7	22	17	5	11	1536	20.2	101	2
8/ 6/82	21	23	8	15	15	11	5	20	20	7	15	1552	23.8	155	1
8/ 7/82	18	18	5	15	19	15	5	17	14	5	8	1548	23.8	-	-
8/ 8/82	12	13	6	9	11	9	6	18	17	5	11	1557	24.0	-	-
8/ 9/82	9	10	5	6	8	7	4	16	14	4	14	1526	21.8	295	5
8/10/82	14	14	4	10	12	10	4	17	10	5	11	1512	21.3	260	3
8/11/82	16	16	8	11	13	12	8	12	11	6	8	1508	20.0	73	6
8/12/82	13	16	7	9	9	10	4	11	12	4	8	1503	19.4	103	4
8/13/82	11	14	6	7	9	9	5	11	12	4	8	1513	18.8	118	5
8/14/82	12	14	6	7	8	10	5	13	10	5	9	1510	18.2	-	-
8/15/82	12	13	7	7	10	9	7	12	9	4	7	1518	18.8	-	-
8/16/82	14	15	7	9	11	10	8	16	12	6	9	1532	19.0	103	6
8/17/82	12	13	8	10	12	12	9	17	13	5	12	1531	21.2	127	6
8/18/82	13	14	5	9	10	-	5	18	17	6	10	1515	20.1	0	0
8/19/82	12	12	5	8	10	-	4	16	16	5	9	1516	22.3	127	6
8/20/82	11	11	5	8	9	-	4	14	15	5	10	1541	22.3	90	1
8/21/82	13	15	5	10	12	-	3	12	9	8	12	1560	24.4	-	-
8/22/82	16	16	6	10	16	-	3	13	10	4	6	1539	26.3	-	-
8/23/82	18	18	6	8	14	7	8	12	11	5	8	1535	24.9	223	3
8/24/82	9	12	5	7	9	8	3	7	13	4	5	1528	22.8	86	3
8/25/82	11	12	5	8	9	10	3	13	11	4	8	1521	24.7	50	5
8/26/82	14	16	6	10	12	11	4	13	11	9	11	1509	22.8	148	3
8/27/82	10	12	7	7	10	10	4	13	10	3	5	1524	21.9	123	2
8/28/82	13	15	5	8	9	11	3	12	9	5	6	1523	19.5	-	-
8/29/82	9	10	7	8	9	8	5	11	9	6	7	1521	16.4	-	-
8/30/82	9	13	5	7	9	9	3	12	13	5	8	1522	17.6	158	5
8/31/82	13	13	7	9	11	9	4	16	17	5	11	1523	19.1	137	2
9/ 1/82	7	9	6	7	9	10	3	18	10	6	17	1544	22.6	295	8
9/ 2/82	16	13	7	13	10	8	4	25	13	11	28	1558	26.8	61	4
9/ 3/82	17	6	10	12	12	11	4	22	21	16	22	1538	24.1	239	2
9/ 4/82	18	-	6	11	9	9	2	22	22	8	18	1537	21.2	-	-
9/ 5/82	19	-	11	14	15	14	5	19	13	9	19	1515	22.6	-	-
9/ 6/82	16	-	7	12	13	12	5	16	17	9	11	1531	22.8	-	-
9/ 7/82	14	-	7	11	10	12	5	21	14	8	12	1503	23.3	114	8
9/ 8/82	12	-	7	8	10	9	6	3	4	1	2	1507	22.6	118	15
9/ 9/82	14	-	6	9	11	11	6	13	9	5	9	1531	18.0	104	6
9/10/82	10	-	5	5	7	8	4	6	11	3	4	1497	19.3	269	6
9/11/82	9	-	8	8	8	9	6	9	8	6	8	1484	15.9	-	-
9/12/82	9	-	6	7	8	9	5	8	7	5	6	1490	18.5	-	-
9/13/82	11	-	6	9	8	11	4	6	7	3	5	1475	16.8	104	8
9/14/82	7	-	5	6	6	7	3	4	5	3	4	1489	12.8	120	13
9/15/82	4	-	4	3	3	5	3	3	2	1	2	1471	7.9	0	0

Daily Maximum Ozone (pphm)

Vandenberg AFB
0400 PST Sounding
850 mb

Pt. Mugu
1000 PST
3000 ft. winds

Date	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)
9/16/82	5	-	5	4	4	4	2	3	3	1	3	1465	7.7	167	16
9/17/82	9	7	6	8	7	7	2	8	11	4	8	1487	6.4	132	9
9/18/82	6	5	5	6	5	5	4	6	3	4	5	1499	10.7	-	-
9/19/82	6	5	5	5	5	5	4	8	6	3	4	1487	13.2	-	-
9/20/82	10	8	8	9	8	8	9	12	11	7	9	1486	13.6	109	7
9/21/82	12	11	8	9	11	12	8	19	14	7	10	1490	17.8	93	6
9/22/82	14	13	8	10	9	10	7	21	12	5	11	1506	20.1	136	2
9/23/82	14	12	7	12	13	12	6	16	16	8	22	1527	22.4	122	12
9/24/82	10	8	11	9	9	7	10	11	9	11	15	1516	17.1	145	7
9/25/82	3	2	9	3	3	3	7	3	1	1	1	1505	17.3	-	-
9/26/82	3	2	4	4	5	4	3	2	1	2	3	1474	14.5	-	-
9/27/82	6	6	4	5	5	6	4	4	4	3	4	1444	8.7	321	7
9/28/82	8	6	8	7	7	7	7	6	6	4	5	1457	9.9	155	4
9/29/82	6	4	6	5	7	6	5	5	4	3	4	1448	12.4	164	6
9/30/82	7	5	5	5	7	5	5	7	5	0	6	1449	9.2	313	2
10/1/82	10	10	10	8	10	7	9	9	8	7	9	1498	11.1	91	3
10/2/82	10	9	7	8	9	7	6	11	8	9	9	1521	16.6	-	-
10/3/82	14	13	10	10	13	9	7	12	11	8	10	1496	16.5	-	-
10/4/82	13	12	8	10	10	9	6	11	13	5	10	1476	14.5	281	2
10/5/82	11	11	9	9	10	8	8	11	10	7	10	1475	11.0	50	29
10/6/82	12	11	6	10	9	7	5	15	9	6	10	1500	16.3	90	7
10/7/82	9	9	6	6	8	8	5	9	7	5	9	1482	9.7	18	5
10/8/82	5	6	5	4	7	4	5	9	4	7	14	1518	13.5	72	12
10/9/82	5	4	5	3	7	4	4	7	3	6	7	1538	17.5	-	-
10/10/82	6	4	5	4	6	4	3	6	4	5	6	1538	13.5	-	-
10/11/82	8	5	5	5	7	5	6	5	4	3	5	1538	14.2	-	-
10/12/82	9	7	10	8	8	4	8	7	5	5	13	1527	16.5	0	0
10/13/82	8	6	7	6	9	4	8	6	5	6	5	1545	16.1	140	10
10/14/82	11	10	3	11	9	7	6	10	6	6	10	1541	16.5	92	10
10/15/82	12	11	3	9	6	7	8	8	8	8	10	1544	16.6	76	4
10/16/82	13	11	3	11	6	8	7	13	9	11	15	1542	17.3	-	-
10/17/82	15	15	3	11	5	8	7	18	16	9	15	1537	14.2	-	-
10/18/82	10	14	5	12	6	12	12	9	12	7	11	1510	16.8	298	3
10/19/82	13	13	3	10	5	9	6	10	11	4	6	1519	14.4	347	9
10/20/82	8	8	2	4	2	7	5	9	9	4	8	1539	10.5	299	14
10/21/82	8	8	7	7	8	5	6	11	11	4	7	1539	12.6	325	3
10/22/82	5	4	5	3	5	2	5	11	1	6	8	1567	17.5	309	13
10/23/82	4	4	3	3	4	3	3	3	3	2	5	1556	16.6	-	-
10/24/82	3	3	2	3	4	3	2	6	4	1	3	1539	12.2	-	-
10/25/82	3	3	1	2	3	1	1	2	2	1	0	1534	12.1	298	12
10/26/82	4	4	4	3	5	3	4	3	3	3	3	1507	9.2	277	16
10/27/82	4	4	4	4	6	4	5	5	3	3	4	1535	6.7	51	26
10/28/82	4	4	4	4	6	4	5	5	5	4	6	1533	10.2	87	13
10/29/82	6	6	5	5	7	4	6	6	7	4	8	1520	16.0	296	5
10/30/82	4	3	4	4	4	3	3	3	2	1	2	1472	12.3	-	-
10/31/82	6	6	5	6	6	4	5	7	6	5	7	1484	6.5	-	-

Date	Daily Maximum Ozone (pphm)												Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds	
	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)		
6/ 1/83	5	5	4	4	4	4	4	3	5	4	4	-	-	179	5		
6/ 2/83	5	5	4	4	5	3	4	3	5	4	4	-	-	97	4		
6/ 3/83	8	8	4	5	7	5	7	6	5	4	4	-	-	139	6		
6/ 4/83	9	9	6	7	8	5	5	10	9	5	7	-	-	-	-		
6/ 5/83	10	9	7	8	9	6	5	13	14	7	9	-	-	-	-		
6/ 6/83	11	11	7	9	10	7	9	18	22	7	15	-	-	327	2		
6/ 7/83	13	10	7	7	8	8	7	12	14	6	9	-	-	283	5		
6/ 8/83	7	7	4	6	7	3	7	8	10	6	6	-	-	207	1		
6/ 9/83	9	8	6	7	8	5	5	8	9	5	6	-	-	78	3		
6/10/83	11	11	7	8	10	7	11	12	13	6	7	-	-	225	2		
6/11/83	7	7	-	7	7	4	7	8	9	6	7	-	-	-	-		
6/12/83	8	8	-	7	7	5	8	9	7	5	7	-	-	-	-		
6/13/83	9	8	7	8	11	7	8	13	16	6	6	-	-	64	24		
6/14/83	14	13	8	12	10	10	8	18	14	10	9	-	-	29	6		
6/15/83	15	14	10	12	13	12	11	19	18	10	10	-	-	196	3		
6/16/83	19	16	10	14	12	13	12	16	13	5	8	-	-	105	6		
6/17/83	14	12	10	10	12	8	10	17	16	7	8	-	-	196	2		
6/18/83	12	11	8	10	11	9	10	15	15	8	10	-	-	-	-		
6/19/83	13	10	8	8	10	8	9	12	12	8	8	-	-	-	-		
6/20/83	12	10	7	7	9	7	9	10	13	7	7	-	-	0	0		
6/21/83	12	12	7	9	10	8	9	11	13	6	7	-	-	94	11		
6/22/83	11	12	8	10	11	10	9	16	12	6	8	-	-	106	9		
6/23/83	13	12	7	9	10	8	9	10	12	5	7	-	-	56	4		
6/24/83	10	9	6	7	9	7	9	13	10	7	9	-	-	118	2		
6/25/83	9	11	6	7	8	8	12	12	15	6	8	-	-	-	-		
6/26/83	10	11	6	8	8	6	7	7	8	6	5	-	-	-	-		
6/27/83	8	7	5	5	7	5	6	6	6	5	5	-	-	278	2		
6/28/83	8	8	5	5	6	6	6	9	11	4	6	-	-	55	2		
6/29/83	11	11	6	8	5	8	9	9	8	5	7	-	-	338	1		
6/30/83	8	8	6	7	9	6	7	7	8	4	7	-	-	103	3		
7/ 1/83	11	11	6	9	10	8	7	10	10	5	7	1492	14.4	323	2		
7/ 2/83	10	9	6	8	6	8	6	8	10	5	6	1507	14.3	-	-		
7/ 3/83	8	8	6	6	7	6	8	13	13	7	9	1498	15.7	-	-		
7/ 4/83	12	11	7	10	8	8	6	13	11	6	6	1509	18.0	-	-		
7/ 5/83	15	14	9	10	-	10	7	16	11	5	8	1514	20.4	126	9		
7/ 6/83	13	11	6	9	-	7	7	13	13	5	5	1491	12.4	88	7		
7/ 7/83	14	12	6	10	10	8	10	13	11	4	7	1498	16.6	26	2		
7/ 8/83	13	11	6	8	10	7	7	7	8	5	10	1508	16.2	210	2		
7/ 9/83	12	10	7	8	10	7	7	18	14	9	11	1526	13.6	-	-		
7/10/83	11	9	8	9	10	7	5	20	10	12	14	1530	17.2	-	-		
7/11/83	18	15	13	12	15	13	13	21	13	9	16	1524	22.9	76	6		
7/12/83	16	14	9	12	12	14	9	31	24	6	11	1527	23.0	351	3		
7/13/83	16	13	10	13	11	13	7	24	26	7	13	1538	24.5	225	3		
7/14/83	19	15	8	10	17	13	8	19	18	4	10	1520	24.3	285	6		
7/15/83	10	11	6	7	10	8	8	9	11	5	5	1488	20.3	308	5		
7/16/83	8	8	6	6	-	6	7	11	9	6	7	1457	18.9	-	-		

Date	Rocketdyne	Simi Valley	Daily Maximum Ozone (pphm)										Vandenberg AFB			Pt. Mugu	
			El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	0400 PST Sounding	850 mb	1000 PST	3000 ft. winds		
7/17/83	13	11	7	8	-	8	4	11	11	6	7	1459	16.3	-	-	-	
7/18/83	12	12	6	8	-	8	5	15	11	8	11	1468	14.4	0	0	-	
7/19/83	12	11	5	8	11	8	6	14	10	10	23	1496	14.6	211	2	-	
7/20/83	13	11	5	11	10	9	8	21	14	16	16	1516	16.2	71	3	-	
7/21/83	16	13	4	11	12	10	6	14	9	6	8	1517	19.6	124	4	-	
7/22/83	15	12	6	8	8	8	7	17	12	8	10	1513	19.1	0	0	-	
7/23/83	16	13	5	9	9	10	7	21	13	7	10	1516	19.7	-	-	-	
7/24/83	15	13	7	10	8	10	8	14	13	7	11	1504	19.1	-	-	-	
7/25/83	13	12	9	10	8	12	10	10	10	7	8	1507	16.7	123	6	-	
7/26/83	14	13	6	10	7	8	6	15	13	8	12	1505	14.5	92	3	-	
7/27/83	16	12	8	12	10	11	8	11	12	5	7	1495	14.8	95	8	-	
7/28/83	12	11	9	12	10	11	12	13	9	5	8	1519	16.6	97	13	-	
7/29/83	15	13	8	11	12	12	8	18	12	7	8	1536	17.6	101	9	-	
7/30/83	15	14	1	10	10	11	8	19	18	8	7	1531	21.3	-	-	-	
7/31/83	15	14	1	9	11	10	6	16	16	6	9	1527	23.0	-	-	-	
8/1/83	17	13	4	11	12	12	8	21	15	8	11	1522	21.8	106	9	-	
8/2/83	17	15	6	11	12	13	9	21	17	6	11	1532	21.1	132	3	-	
8/3/83	14	13	7	9	11	11	9	21	13	5	8	1534	20.4	5	1	-	
8/4/83	13	12	8	8	9	11	8	23	16	6	10	1540	20.7	260	0	-	
8/5/83	14	10	6	9	9	11	7	25	16	9	13	1554	23.9	38	1	-	
8/6/83	13	11	13	9	11	10	16	15	12	12	13	1550	26.4	-	-	-	
8/7/83	13	10	5	10	10	9	7	19	12	13	15	1545	23.2	-	-	-	
8/8/83	15	13	4	8	12	11	7	20	14	2	8	1532	23.0	291	6	-	
8/9/83	11	9	5	9	12	11	11	14	12	8	15	1515	22.0	124	14	-	
8/10/83	13	13	7	11	12	13	6	16	11	4	6	1513	18.2	121	14	-	
8/11/83	12	11	8	9	13	10	8	12	7	3	6	1524	19.3	99	12	-	
8/12/83	14	11	7	10	9	9	7	12	12	7	13	1533	21.2	112	8	-	
8/13/83	9	7	5	8	8	6	6	17	6	5	13	1519	19.9	-	-	-	
8/14/83	6	6	3	6	6	5	6	14	8	6	12	1527	22.0	-	-	-	
8/15/83	14	11	8	12	12	11	7	26	21	8	22	1514	21.7	104	10	-	
8/16/83	18	16	8	14	11	11	7	24	15	4	13	1530	21.8	64	5	-	
8/17/83	14	12	9	13	10	12	8	23	16	5	16	1514	21.7	114	4	-	
8/18/83	3	2	2	3	3	2	5	2	1	1	2	1505	15.7	132	14	-	
8/19/83	3	2	3	3	3	2	4	1	2	2	2	1504	13.0	151	6	-	
8/20/83	5	4	3	5	5	4	5	3	3	3	3	1515	7.4	-	-	-	
8/21/83	5	5	2	5	5	5	5	7	6	3	4	1515	9.4	-	-	-	
8/22/83	10	9	6	7	7	8	6	10	10	5	7	1517	12.0	151	3	-	
8/23/83	10	9	4	10	7	8	7	15	12	9	7	1516	14.0	225	0	-	
8/24/83	13	12	5	7	8	10	7	15	12	5	10	1508	14.4	106	5	-	
8/25/83	14	12	6	10	10	10	2	17	14	7	13	1537	16.2	109	4	-	
8/26/83	13	11	7	11	12	10	7	19	12	13	16	1539	19.9	0	0	-	
8/27/83	15	13	7	14	10	10	9	25	16	16	20	1531	20.7	-	-	-	
8/28/83	14	15	9	13	10	11	5	24	16	11	22	1535	20.6	-	-	-	
8/29/83	11	8	6	11	8	10	8	19	10	9	16	1522	20.1	232	2	-	
8/30/83	10	9	5	9	8	8	7	21	25	8	14	1515	20.9	183	2	-	
8/31/83	7	6	5	7	6	8	4	12	6	3	7	1513	18.5	295	4	-	

Date	Daily Maximum Ozone (pphm)										Vandenberg AFB 0400 PST Sounding 850 mb			Pt. Mugu 1000 PST 3000 ft. winds		
	Rocketdyne	Simi Valley	El Rio	Thousand Oaks	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	Height (msl)	Temp (°C)	Dir (°)	Spd (kts)	
9/ 1/83	6	6	4	6	8	6	7	18	9	4	9	1523	18.3	-	-	
9/ 2/83	9	9	5	8	8	8	9	22	24	6	16	1515	21.4	273	3	
9/ 3/83	15	13	5	11	11	12	6	19	14	8	13	1499	21.8	-	-	
9/ 4/83	14	11	7	12	9	11	4	20	13	6	10	1556	18.1	-	-	
9/ 5/83	16	12	9	11	10	11	-	22	18	11	15	1550	21.4	-	-	
9/ 6/83	17	15	7	13	12	13	9	27	13	7	9	1478	23.0	128	8	
9/ 7/83	15	14	5	9	10	10	6	13	16	5	12	1481	21.7	128	7	
9/ 8/83	10	10	5	9	7	7	5	14	11	4	7	1480	18.4	152	4	
9/ 9/83	7	6	6	8	7	7	6	15	7	7	14	1496	19.8	158	2	
9/10/83	14	11	12	15	11	11	8	19	17	14	23	1515	23.5	-	-	
9/11/83	11	10	14	12	8	11	10	20	13	18	19	1527	24.5	-	-	
9/12/83	28	23	7	18	14	17	15	15	20	7	11	1525	25.5	132	4	
9/13/83	18	16	13	13	12	15	13	22	20	8	14	1530	25.6	120	3	
9/14/83	19	15	10	12	15	14	12	25	18	6	16	1521	24.6	235	3	
9/15/83	17	15	8	10	12	13	10	28	9	7	11	1524	25.6	128	3	
9/16/83	14	15	7	9	9	12	9	28	16	6	12	1521	24.4	88	4	
9/17/83	18	17	8	12	13	14	5	23	16	10	19	1516	22.8	-	-	
9/18/83	14	15	7	10	10	12	4	22	19	12	20	1503	22.1	117	5	
9/19/83	13	12	10	10	12	11	14	11	12	4	11	1494	22.5	120	21	
9/20/83	9	10	5	6	6	6	6	5	8	2	3	1515	21.2	78	15	
9/21/83	5	7	2	3	5	5	5	10	10	3	5	-	-	117	12	
9/22/83	7	7	3	4	5	4	5	7	9	3	4	1514	14.8	167	2	
9/23/83	7	8	6	6	6	6	6	9	10	4	6	1521	13.4	113	2	
9/24/83	11	11	7	9	8	9	-	8	11	4	6	1518	13.2	-	-	
9/25/83	10	10	7	8	8	8	-	14	10	5	11	1525	13.7	111	9	
9/26/83	5	7	5	5	5	5	5	5	4	4	4	1518	7.9	231	4	
9/27/83	8	9	6	8	6	7	7	5	7	3	5	1508	10.3	113	9	
9/28/83	5	6	4	5	5	5	8	3	4	3	4	1470	10.2	128	8	
9/29/83	3	6	5	4	4	4	6	3	3	3	3	1454	8.8	223	6	
9/30/83	3	3	3	4	3	3	5	2	1	1	1	1409	6.3	184	10	
10/ 1/83	4	6	4	5	4	3	5	4	5	3	3	1539	14.3	-	-	
10/ 2/83	6	7	4	5	4	4	5	7	5	4	5	1493	8.1	-	-	
10/ 3/83	9	9	6	9	7	7	7	11	7	8	12	1498	10.6	69	17	
10/ 4/83	14	15	6	11	8	6	7	16	11	4	7	1512	15.3	63	17	
10/ 5/83	7	8	5	6	6	5	7	5	8	3	4	1511	13.5	104	5	
10/ 6/83	11	9	5	10	7	5	7	13	13	10	11	1539	14.3	100	9	
10/ 7/83	-	6	5	6	5	5	6	11	8	4	6	1512	13.5	-	-	
10/ 8/83	-	4	5	5	3	3	6	4	2	4	3	1514	14.1	-	-	
10/ 9/83	-	6	4	5	5	4	6	7	4	4	4	1517	9.4	-	-	
10/10/83	-	6	4	7	8	5	7	0	9	6	7	1536	9.6	-	-	
10/11/83	-	6	4	5	6	4	8	18	3	8	19	1547	19.6	-	-	
10/12/83	-	7	4	7	7	5	8	10	6	4	8	1564	23.0	-	-	
10/13/83	-	11	5	9	8	8	12	12	7	11	1510	16.0	-	-		
10/14/83	-	12	9	12	7	7	9	6	8	6	6	1471	10.1	-	-	
10/15/83	-	10	7	9	8	7	8	6	7	4	5	1480	9.7	-	-	
10/16/83	-	9	6	8	7	7	6	10	9	8	11	1498	10.0	-	-	

Date	Rocketdyne	Daily Maximum Ozone (pphm)										Vandenberg AFB			Pt. Mugu	
		Thousand Oaks	Simi Valley	El Rio	Ojai	Piru	Ventura	Burbank	Reseda	Lennox	West L.A.	0400 PST Sounding	850 mb	1000 PST	3000 ft. winds	
10/17/83	-	9	5	7	7	6	9	4	5	4	1	1490	11.2	-	-	
10/18/83	-	9	6	9	8	7	9	16	15	10	13	1496	15.4	-	-	
10/19/83	-	18	15	18	8	15	9	19	20	1	17	1490	16.6	-	-	
10/20/83	-	21	8	19	13	19	11	14	16	5	9	1488	17.2	-	-	
10/21/83	-	13	9	14	9	9	12	9	11	9	10	1518	15.6	-	-	
10/22/83	-	7	8	7	5	5	9	7	6	14	19	1541	16.4	-	-	
10/23/83	-	11	6	10	11	8	7	15	11	8	10	1524	16.9	-	-	
10/24/83	-	4	5	4	6	3	8	8	3	5	7	1518	12.5	-	-	
10/25/83	-	4	3	5	6	4	7	8	3	5	11	1561	16.4	-	-	
10/26/83	-	5	2	5	4	4	8	6	7	5	9	1553	17.1	-	-	
10/27/83	-	9	14	9	14	10	17	8	9	7	11	1518	17.0	-	-	
10/28/83	-	13	9	10	11	11	13	14	15	5	11	1536	16.1	-	-	
10/29/83	-	7	5	6	6	8	7	7	8	5	7	1543	13.8	-	-	
10/30/83	-	4	4	3	4	3	6	2	3	3	3	1525	9.8	-	-	
10/31/83	-	3	3	3	3	2	5	2	2	1	2	1519	10.0	-	-	

APPENDIX C

AMBIENT HYDROCARBON DATA ANALYSIS

APPENDIX C

Ambient Hydrocarbon Data Analysis

Ozone formation is strongly influenced by the amount and speciation of ambient hydrocarbons. Theoretical models and ambient measurements show strong correlation between ozone concentrations and hydrocarbon concentrations. Measurements made in urban areas over the last two decades have shown that the nonmethane hydrocarbon (NMHC) concentrations have large day-to-day variability like other pollutant concentrations; however, the relative amount of different species in the NMHCs is fairly constant and similar in most urban areas.

Ambient NMHC data collected by CARB during the 1980 SANBOX study were analyzed to investigate the NMHC speciation in Ventura and Santa Barbara Counties. The 1980 data base was selected because it is the only one that has a significant number of samples (200 between September 2 and October 6) and accurate speciation information in the study area. The analysis was exploratory and intended to provide preliminary answers to the following questions:

- 1) What is the average NMHC speciation at stations in the study area?
- 2) Is there significant variability in NMHC speciation between stations, or is the speciation similar at most stations?
- 3) Are the NMHC concentration and speciation significantly different on days with high and low ozone concentrations?
- 4) Is the speciation similar to observations in other urban areas?

The hydrocarbon samples were collected in canisters for three-hour intervals and subsequently analyzed by gas chromatography at CARB's El Monte laboratory. The samples were primarily collected between 6:00 and 9:00 a.m.; however, some additional samples were collected between 9:00 and 12:00 a.m. and 12:00 and 3:00 p.m. C2 through C10 hydrocarbons were analyzed; however, the speciation above C5 was very limited. Approximately 20 species or groups of species were reported in the CARB analysis, which is far fewer than the normal 50 to 200 species reported

in GC analysis of ambient NMHC. The data were combined into the following six groups for display purposes:

- ethane (C₂H₆)
- acetylene (C₂H₂)
- >C₂ alkanes
- ethylene (C₂H₄)
- >C₂ alkenes
- aromatics

Ethane and acetylene are very slowly reacting compounds that do not contribute significantly to hydrocarbon oxidation of NO_x. Acetylene is reported separately here because it is a tracer for automobile exhaust. The greater than C₂ alkanes, ethylene, >C₂ alkenes, and aromatic compounds are reactive compound which contribute to ozone formation. Most of the available computer models distinguish the roles of these four different types of hydrocarbons.

The location of the measurement stations are shown in Figure C-1. The map shows that three stations are in Ventura County, four are in Santa Barbara County, and one is on the border. The total NMHC concentrations and speciation on the six-class system are shown in Figures C-2 through C-11 for the eight stations. Table C-1 lists the minimum, mean, and maximum NMHC concentrations observed in the study period by station. These show considerable day-to-day and station-to-station variability in NMHC concentrations.

The data from Pt. Conception and Gaviota Pass show much lower concentrations than the other stations due to their greater distance from the population centers and dominant emission sources. These more remote stations have average NMHC concentrations of 0.22 to 0.26 ppmC. The data from the other six stations show average concentrations of 0.64 to 0.93 ppmC, and maximum concentrations of 1.5 to 2.0 (when the El Rio outlier is ignored). These average and maximum concentrations are similar to ambient concentrations in many moderately populated regions of the country.

Figure C-12 shows the average normalized speciation of the ambient NMHCs in the area. The data show the average mixtures contain 58 to 72%

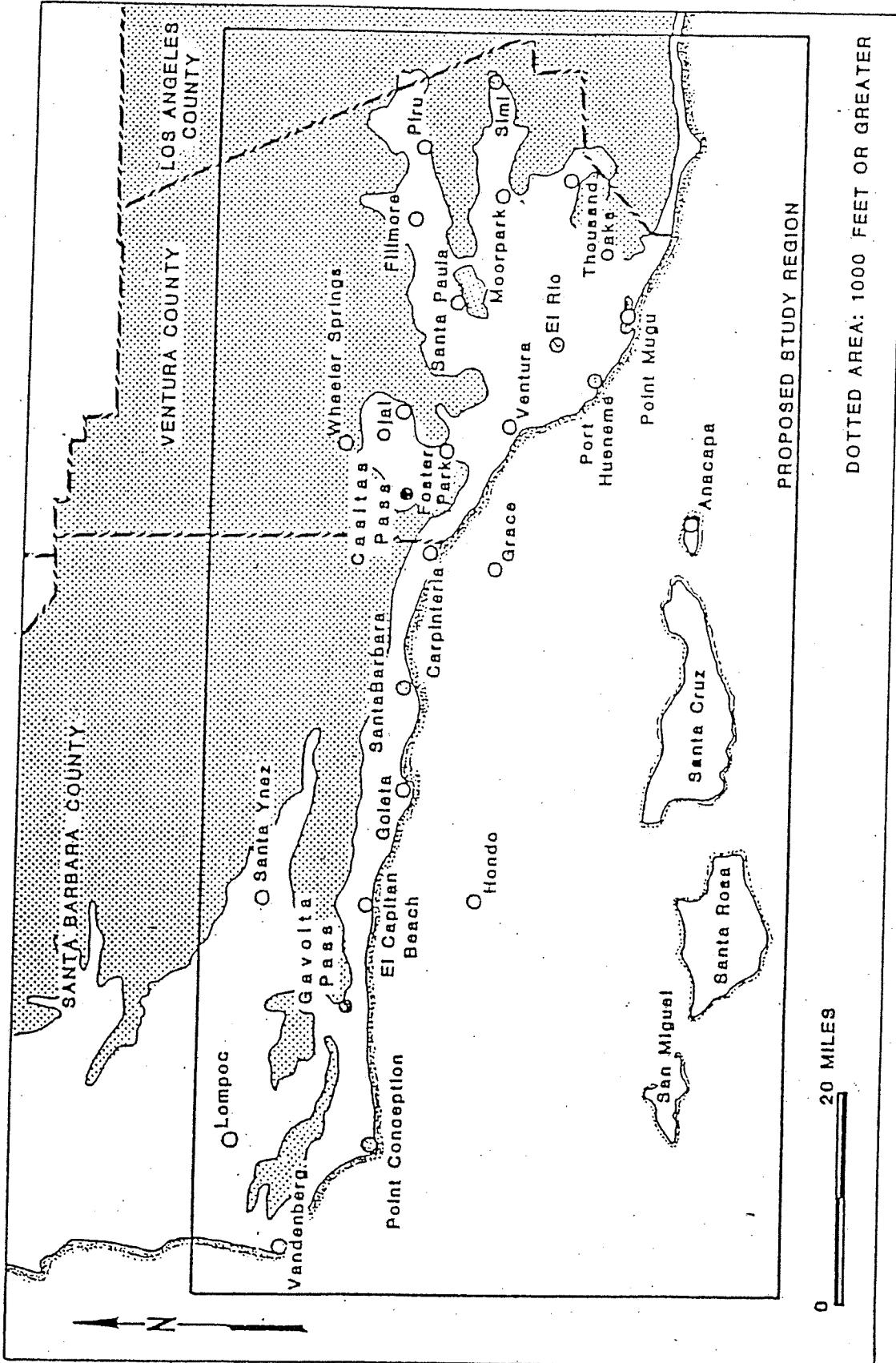


Figure C-1. NMIC Monitoring Sites (solid circles) in the 1980 SANBOX study.

Port Huensem

Hydrocarbon for Sept 2 - Oct 6 (6-9am)

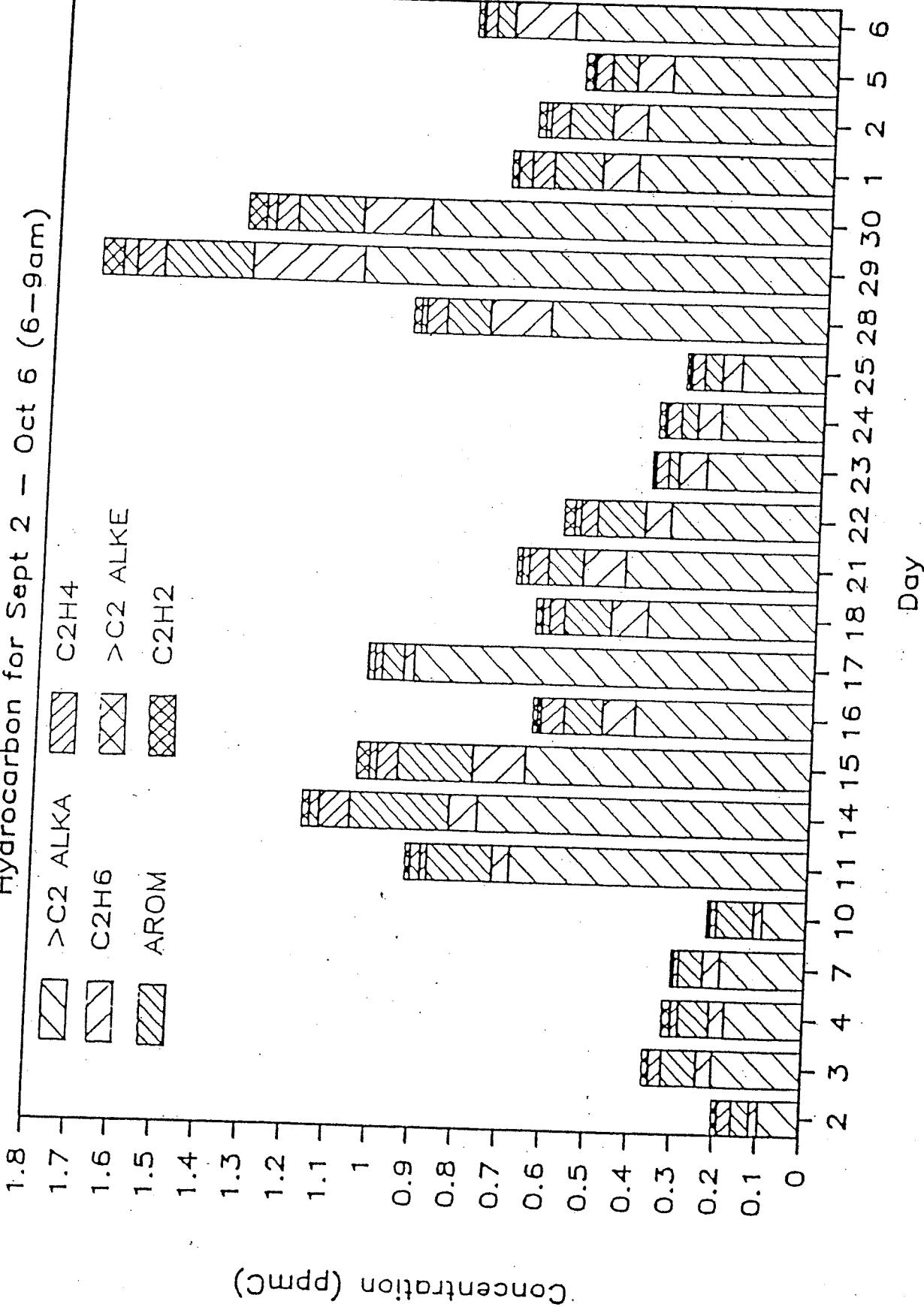


Figure C-2. NMHC Concentrations Observed at Port Huensem in the 1980 SANBOX Study

Rio Mesa High School

Hydrocarbon for Sept 3 - Oct 6 (9am-12pm)

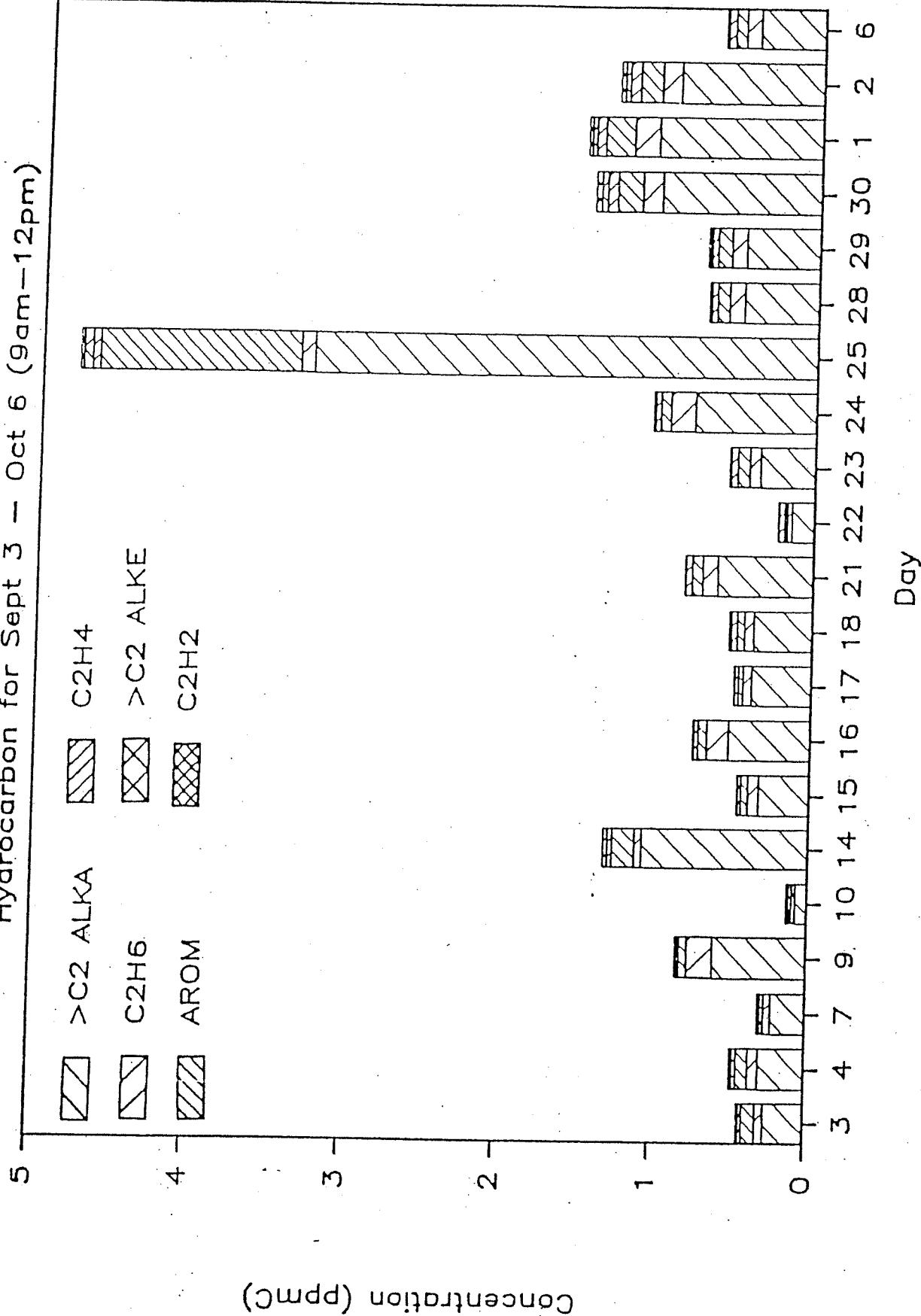


Figure C-3. NMHC Concentrations Observed at El Rio in the 1980 SANBOX Study

Simi Valley

Hydrocarbon for September (6 - 9 am)

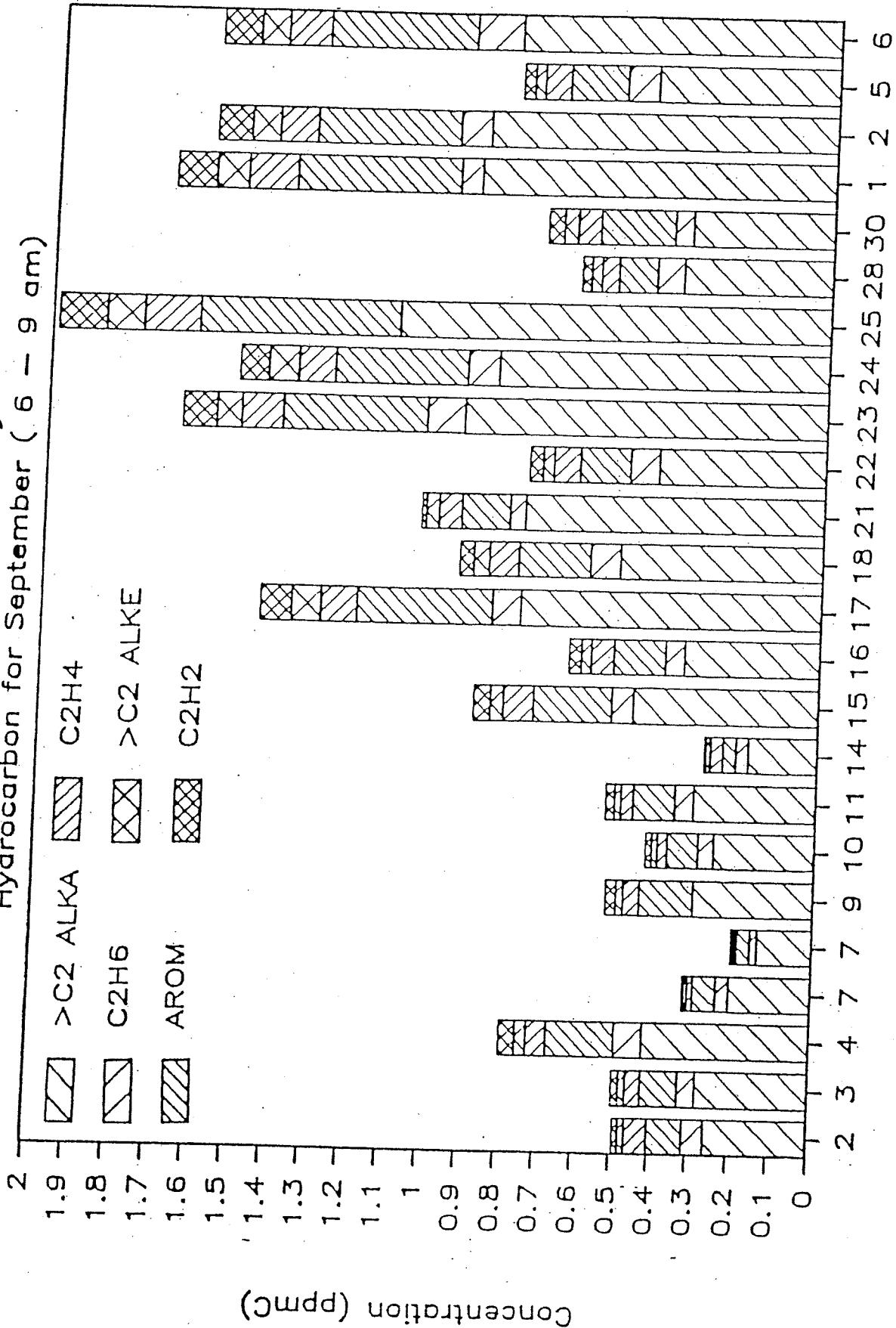


Figure C-4.

NMHC Concentrations Observed at Simi Valley in the 1980 SANBOX Study

Simi Valley

Hydrocarbon for September (12 - 15 pm)

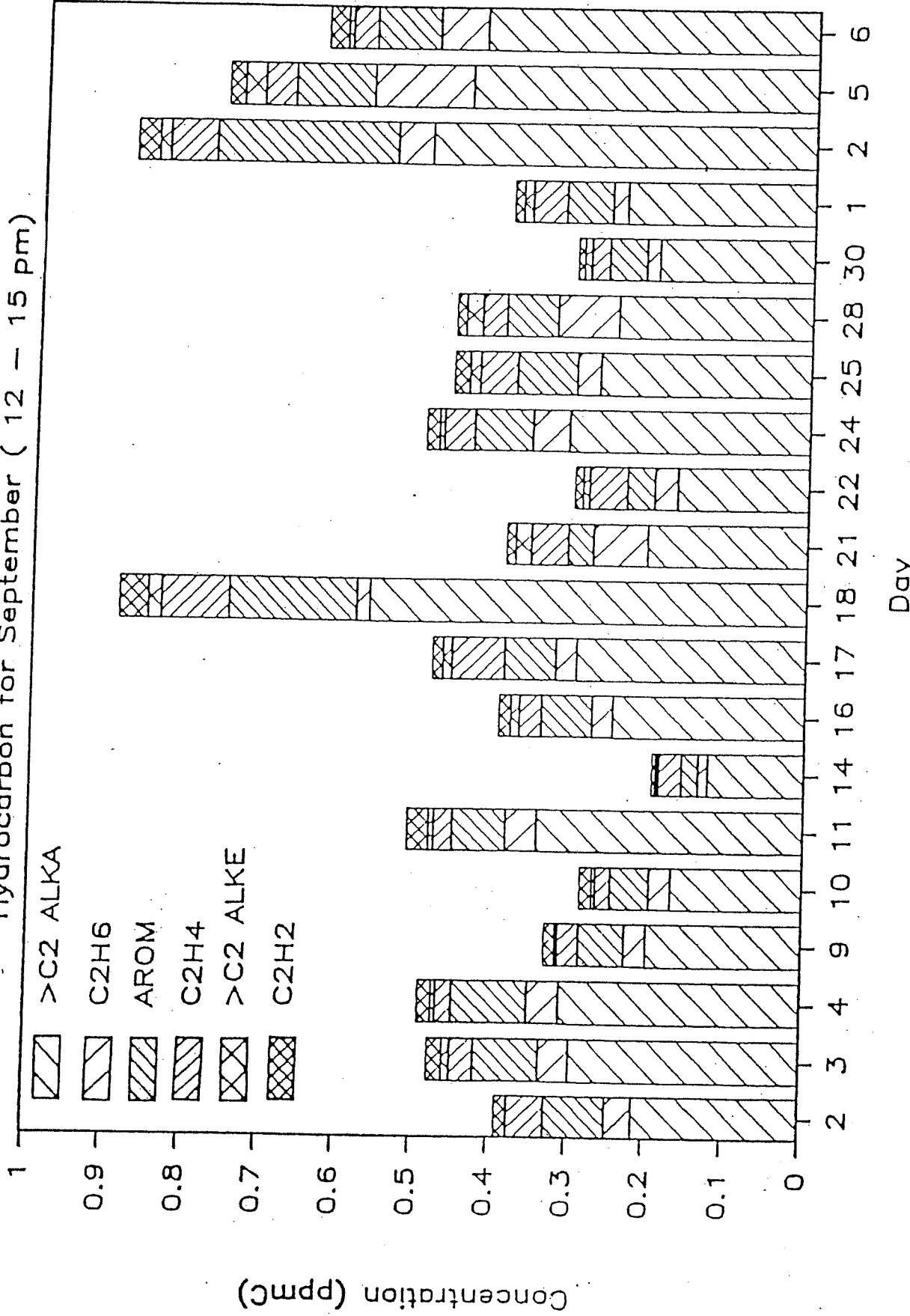


Figure C-5. NMHC Concentrations Observed at Simi Valley in the 1980 SANBOX Study

Casitas Pass

Hydrocarbon for September (6 - 9 am)

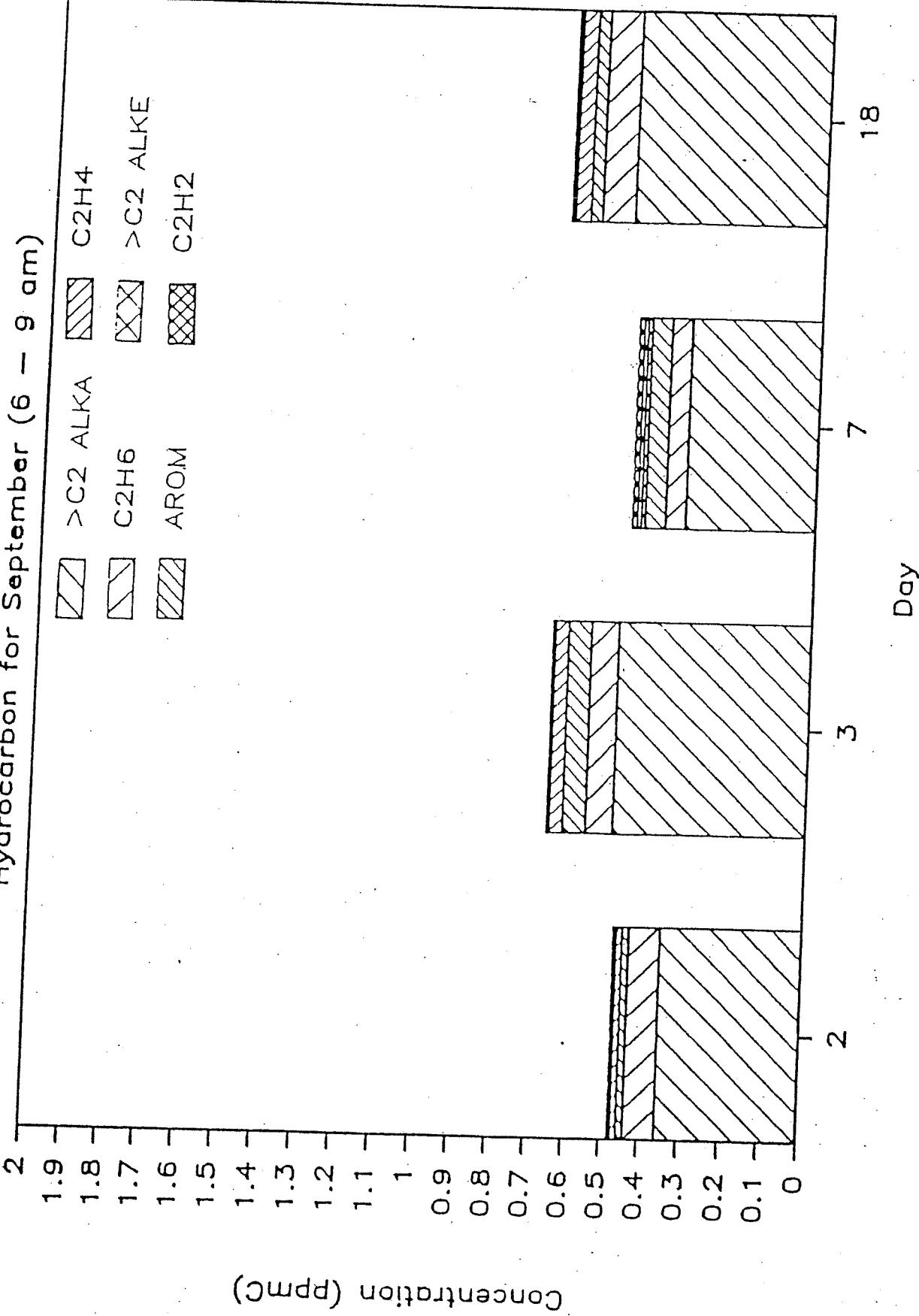


Figure C-6. NMHC Concentrations Observed at Casitas Pass in the 1980 SANBOX Study

Casitas PASS

Hydrocarbon for Sept 4 - Oct 6 (9am-12pm)

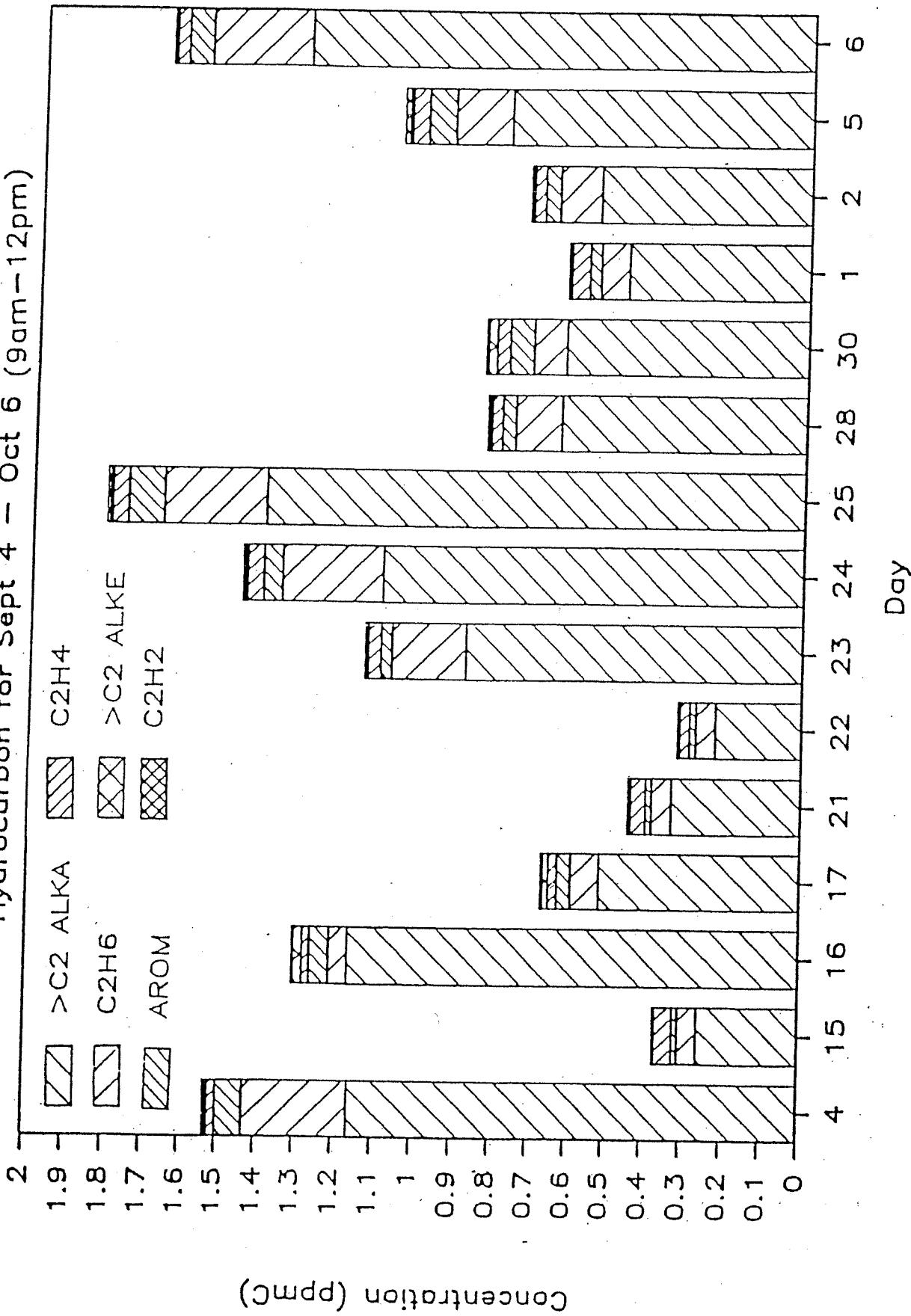


Figure C-7. NMHC Concentrations Observed at Casitas Pass in the 1980 SANBOX Study